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1979

FMFM 5-4

OFFENSIVE AIR SUPPORT

U. S. MARINE CORPS

PCN 139 000357 00

DEPARTMENT OF THE NAVY
HEADQUARTERS UNITED STATES MARINE CORPS
WASHINGTON, D.C. 20380

13 September 1979

FOREWORD

1. PURPOSE

This publication, FMFM 5-4, Offensive Air Support, sets forth doctrine, tactics, and techniques to be employed in operations and training involving offensive air support within the Fleet Marine Force.

2. SCOPE

This manual expands the doctrine, tactics, and techniques applicable to the employment of tactical air for offensive air support contained in FMFM 5-1, Marine Aviation. Specific guidance is provided for air control in close air support. This manual also contains detailed information on attack aircraft, ordnance, and weapons effectiveness.

3. CHANGES

Recommendations for improving this manual are invited from commands as well as directly from individuals. The attached User Suggestion Form should be utilized by individuals and forwarded to the Commanding General, Marine Corps Development and Education Command (Code D 036), Quantico, Virginia 22134.

4. CERTIFICATION

Reviewed and approved this date.

BY DIRECTION OF THE COMMANDANT OF THE MARINE CORPS

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To: Commanding General, Marine Corps Development and Education Command
(Code D 036), Quantico, Virginia 22134

Subj: FMFM 5-4, Offensive Air Support; recommendation concerning

1. In accordance with the Foreword to FMFM 5-4, which invites individuals to submit suggestions concerning this FMFM directly to the above addressee, the following unclassified recommendation is forwarded:

Page	Article/Paragraph No.	Line No.	Figure/Table No.

Nature of Change: ___ Add ___ Delete ___ Change ___ Correct

1. Proposed New Verbatim Text: (Verbatim, double spaced; continue on additional pages as necessary.)

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OFFENSIVE AIR SUPPORT

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CHAPTER 1

FUNDAMENTALS OF OFFENSIVE AIR SUPPORT

Section I. INTRODUCTION

1101. GENERAL

a. One of the most effective uses of aircraft is to deliver firepower against the enemy. This is an especially valuable capability when artillery support is not available. Prior to and during the actual landing of troops and cargo in an amphibious operation, the ground commander relies extensively on naval gunfire (NGF) and air support. Although artillery eventually replaces naval gunfire as the operation progresses inland, air support continues to be a vital asset for the ground commander to exploit at every opportunity.

b. The needs of the ground commander and the scheme of maneuver will dictate the types of offensive air support conducted. Generally, there are two categories of offensive air support: close air support (CAS) and deep air support. Offensive air support does not include attacks against enemy aircraft or their supporting facilities. These operations are a function of antiair warfare and are discussed in FMFM 5-5, Antiair Warfare.

1102. HISTORICAL EVOLUTION

a. The Marine Corps was introduced to offensive air support in the closing weeks of World War I. The U.S. Marine Corps Northern Bombing Group dropped 14 tons of bombs behind enemy lines from 14 October to 11 November 1918. Subsequently, there was very little activity in the use of Marine aircraft as an offensive weapon until the "Banana Wars" in the 1920's. During the Nicaraguan campaign, the Marine Corps used aircraft for support of ground troops on several occasions and it was at this time that the air/ground team was conceived. Although the development of close air support did not make significant progress until several years later in World War II, the events of the 1930's gave Marine aviation firm footing in the Marine Corps mission. The development of the Fleet Marine Force in 1933, the establishment of Marine air as a separate section under the Commandant of the Marine Corps in 1935, and the assignment of a mission for Marine aviation in 1939 all paved the way for the air/ground team which we know today.

b. Offensive air support during World War II primarily consisted of the bombing of enemy air and naval bases and supporting amphibious landings. As control measures improved and aviators gained more experience, close air support was employed more frequently and with greater effectiveness. During the Okinawan campaign, close air support played a critical role and was employed more efficiently than in any other Central Pacific operation. During one campaign, over 14,000 close support sorties were flown by carrier and land based aircraft. By the end of World War II, offensive air support was well established as a function of Marine aviation.

c. Offensive air support was used extensively during the conflicts in Korea and Vietnam. The sophisticated electronic equipment developed during the Vietnam war allowed CAS and direct air support to be performed during all weather conditions, including periods of darkness. The advent of "smart bombs" such as television and laser-guided weapons has significantly increased the capabilities for Marine aviation to support the ground troops in both the deep and close air support roles. The advances that the Marine Corps has gained in offensive air support have greatly contributed to the Marine air-ground team concept.

1103. FUNCTION OF OFFENSIVE AIR SUPPORT

Offensive air support are those air operations which deliver firepower against enemy installations, facilities, and personnel. They are conducted to directly assist the attainment of ground objectives in the amphibious operation area by destruction of enemy resources or the isolation of his military force. Offensive air support may be subdivided by categorizing operations according to the degree of coordination required with the ground combat element. These categories, deep and close air support, are discussed later in the text. The objectives of offensive air support are neutralization and destruction.

a. Neutralization.--Neutralization missions are designed to render areas, weapons, or enemy forces ineffective. Typical missions may be conducted to provide temporary neutralization of hostile fires on or near a landing force terrain objective and to furnish protection to a helicopterborne force along their approach and retirement routes. Other missions may include attacks against installations or areas to which the enemy requires frequent access to support his combat activity.

b. Destruction.--All tactical air support missions, whose primary purpose is to destroy, are considered destruction missions. They are conducted for the broad purpose of destroying the enemy, his equipment and supplies, his installations, and personnel. Destruction missions are of primary interest to the commander landing force (CLF). Their nature changes as the operation progresses. Initial emphasis is given to isolating the enemy forces in the objective area from their sources of reinforcement and logistic support. Later, emphasis shifts to destruction of the enemy's ground forces in the immediate battle area. While complete destruction is the ideal objective of all offensive air support, it is often prohibitive in terms of the number of sorties and the amount/types of ordnance required. Therefore, destruction missions are frequently restricted to personnel and high priority installations. Neutralization missions are directed toward the remaining targets.

1104. FUTURE CONSIDERATIONS

a. Marine aviation has experienced relatively uncontested skies since World War II. American air superiority in Korea and Vietnam enhanced air support of ground troops; however, extensive on-call support may not be possible in future wars. The advent of small, mobile surface-to-air missiles (SAM's) poses a formidable threat to low flying aircraft, especially helicopters and slow fixed-wing reconnaissance aircraft. The recent wars in the Middle East have demonstrated the tremendous effect these missiles can have on the conduct of air and land battles. It is now possible for air superiority to be attained with missiles alone. It may be that, in the future, missiles will become so sophisticated and accurate that offensive air support with manned aircraft will become too costly or impossible. Countermeasures in the form of tactics, techniques, and electronic warfare must be developed on a continuing basis if the ground commander is to receive the support he has experienced in the past.

b. Close air support plays a critical role in the amphibious operation. The initial landing of troops is heavily dependent upon naval gunfire and close air support until artillery is placed ashore. Even after the operation progresses inland, the relatively light artillery of the Marine air-ground task force (MAGTF) relies upon aircraft to deliver heavy ordnance on the enemy, both close in and beyond the fire support coordination line (FSCL). Whatever the future holds, this firepower must be available or the success of any amphibious assault may be in question.

Section II. TERMINOLOGY

1201. GENERAL

This section provides an abbreviated list of terms often encountered in Marine aviation and which are especially useful in understanding offensive air support. Familiarity with the terms and their meanings provide a key to this subject and will also provide a better understanding of Marine aviation in general.

1202. REFERENCES

The terms in this section and throughout this publication are consistent with other Fleet Marine Force Manuals (FMFM's). Specifically, JCS Pub 1, Department of Defense Dictionary for Military and Associated Terms; NWP 3, Naval Terminology; and LFM 01, Doctrine for Amphibious Operations, provide the primary references for the entire aviation FMFM series. Throughout this manual, the use of quotation marks without specific reference indicates a definition quoted from JCS Pub 1, or that the meaning of the term is as defined in JCS Pub 1.

1203. DEFINITIONS

a. Airborne Forward Air Controller (AFAC).--"A specifically trained and qualified tactical fighter pilot to perform dual tasks of conducting aerial reconnaissance/surveillance and of exercising control from the air of aircraft engaged in close air support of ground troops." (LFM 01)

b. Air Interdiction.--"Air operations conducted to destroy, neutralize, or delay the enemy's military potential before it can be brought to bear effectively against friendly forces, at such distance from friendly forces that detailed integration of each air mission with the fire and movement of friendly forces, is not required."

c. Armed Reconnaissance.--"A mission with the primary purpose of locating and attacking targets of opportunity; i.e., enemy material, personnel, and facilities, in assigned general areas or along assigned ground communications routes, and not for the purpose of attacking specific briefed targets."

d. Close Air Support.--"Air attacks against hostile targets which are in close proximity to friendly forces and which require detailed integration of each air mission with the fire and movement of those forces."

e. Deep Air Support.--Air action conducted against enemy targets which does not require detailed integration of each mission with the fire and movement of friendly ground forces. Deep air support missions are normally conducted beyond the FSCL.

f. Direct Air Support.--Air support provided as a direct response to a request by the supported unit. It may include offensive air support, assault support, reconnaissance, early warning, or such other forms of air support as may be requested.

g. Forward Air Controller (FAC).--"An officer member of the tactical air control party who, from a forward ground or airborne position, controls aircraft engaged in close air support of ground troops." (JCS Pub 1) "When the FAC is airborne, he is termed AFAC." (LFM 01)

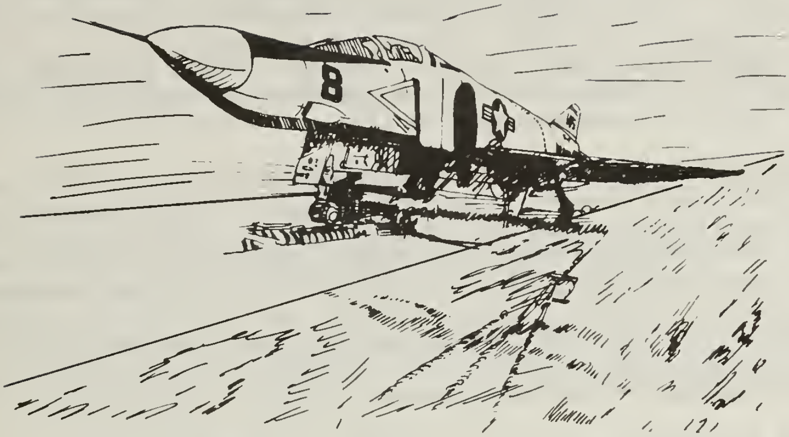
h. Immediate Air Support.--"Air support to meet specific requests which arise during the course of a battle and which, by their nature, cannot be planned in advance."

i. Naval Aviation Observer (NAO).--An airborne observer/controller whose mission is to observe or take photographs, adjust and spot for artillery and naval gunfire, control close air support strikes, and to assist in the coordination of supporting fires.

j. Preplanned Mission.--An airstrike on a target which can be anticipated sufficiently in advance to permit detailed mission coordination and planning.

k. Tactical Air Control Party (TACP).--"A subordinate operational component of a tactical air control system designed to provide air liaison to land forces and for the control of aircraft."

l. Tactical Air Coordinator (Airborne) (TAC(A)).--"An officer who coordinates, from an aircraft, the action of combat aircraft engaged in close support of ground or sea forces."



CHAPTER 2

ORGANIZATIONS AND MISSIONS

Section I. INTRODUCTION

2101. GENERAL

This section describes the offensive air support means found in the Marine aircraft wing (MAW), Marine aircraft group (MAG), and in appropriate aviation squadrons. Specific missions and tasks are listed in FMFM 5-1, Marine Aviation, but will be reiterated when necessary to provide a better understanding of this function of Marine aviation.

2102. MARINE AIRCRAFT WING

The elements within the MAW tasked with the offensive air support role are the VMA, VMFA, VMA(AW), and HMA squadrons. The offensive air support role of the HMA is discussed in FMFM 5-3, Assault Support. Other squadrons support this effort such as VMGR (air refueling) and VMO (AFAC/NAO), but this section will be primarily concerned with the squadrons tasked with ordnance delivery. It should be noted, however, that all elements of the MAW mutually support each other while performing their respective tasks. This includes, not only aircraft squadrons, but the many support elements such as Marine air base squadrons (MABS), headquarters and maintenance squadrons (H&MS), Marine air control squadrons (MACS), engineer squadron, transportation squadron, headquarters and ground maintenance squadrons (H&GMS's), and air support radar teams (ASRT's).

2103. MARINE AIRCRAFT GROUP (VMA/VMFA)

The mission of the MAG(VF/VA) is to conduct antiair warfare and offensive air support operations in support of Fleet Marine Forces from advanced bases, expeditionary airfields, or aircraft carriers and conduct such other air operations as may be directed. Each fixed-wing MAG has a headquarters and maintenance squadron and an air base squadron. The remainder of the group is task organized to provide the capability to perform commitments assigned. The concept of task organizing aircraft groups, whether in training or combat, provides significant flexibility in assignment of assets and the opportunity to structure units to do a specific job and meet specific situations. Examples of the MAG(VF/VA) aircraft squadron mix and the rationale for each composition follows:

a. First Example.--Either structure shown would provide considerable air support with three attack (VMA) squadrons (48-60 aircraft), the MAG would be capable of providing all categories of offensive air support and contribute to the antiair warfare effort. Three fighter/attack (VMFA) squadrons (36 aircraft) provide an excellent air-to-air intercept capability for the antiair warfare (AAW) function and an adequate offensive air support capability. Both structures would have the advantage of ease of maintenance and supply by reducing the different types of aircraft to be supported and missions to be performed:

MAG Headquarters	VMA		VMFA
H&MS	VMA	or	VMFA
MABS	VMA		VMFA

b. Second Example.--Either mix chosen in this example would have the advantage of an all-weather attack (VMA(AW)) capability added to the capabilities mentioned in the first example. Having more than one type of aircraft in each structure would add to the group supply and maintenance effort:

MAG Headquarters	VMA		VMFA
H&MS	VMA	or	VMFA
MABS	VMA(AW)		VMFA
	VMA(AW)		VMA(AW)

c. Third Example.--This structure enhances the capability to conduct all categories of antiair warfare and offensive air support operations. A group so structured, however, would have tremendous complexities of supply and maintenance, even though it might provide the most desirable tactical composition. This would be especially true if this group was assigned to operate independently from other aviation units. The supply and maintenance problems stem from the complexity of modern combat aircraft and the unique support equipment required. Complex radars, airborne weapons control systems, power plants, air frames, electronic devices, test equipment, as well as the personnel and their training programs vary considerably with types of aircraft and missions of squadrons. Graphically, the basic components of the MAG(VF/VA) would be as shown in figure 1:

MAG Headquarters	VMA (A-4 type aircraft)
H&MS	VMA (AV-8 type aircraft)
MABS	VMA(AW) (A-6 type aircraft)
	VMFA (F-4 type aircraft)

d. Tasks Assigned to a Fixed-Wing MAG

(1) Conduct antiair warfare and offensive air operations in support of Fleet Marine Forces and such other air operations as may be directed.

(2) Maintain the capability to deploy and operate from aircraft carriers, advanced bases, and expeditionary airfields.

(3) Conduct, supervise, and coordinate such training for individuals and units as required to qualify assigned squadrons for tactical deployment and combat operations.

(4) Maintain the capability of manning and operating expeditionary airfields.

(5) Augment shore establishments, when based thereon, with personnel and equipment as directed by appropriate authority.

(6) Coordinate air-sea rescue services at advanced bases.

(7) Coordinate requirements for ground defense with appropriate commands when in a separate location.

(8) Provide for the internal security of assigned areas.

(9) Maintain the capability to plan and conduct nuclear and chemical weapons delivery, utilizing weapons compatible with assigned aircraft when deployed and not under the operational control of a Marine aircraft wing.

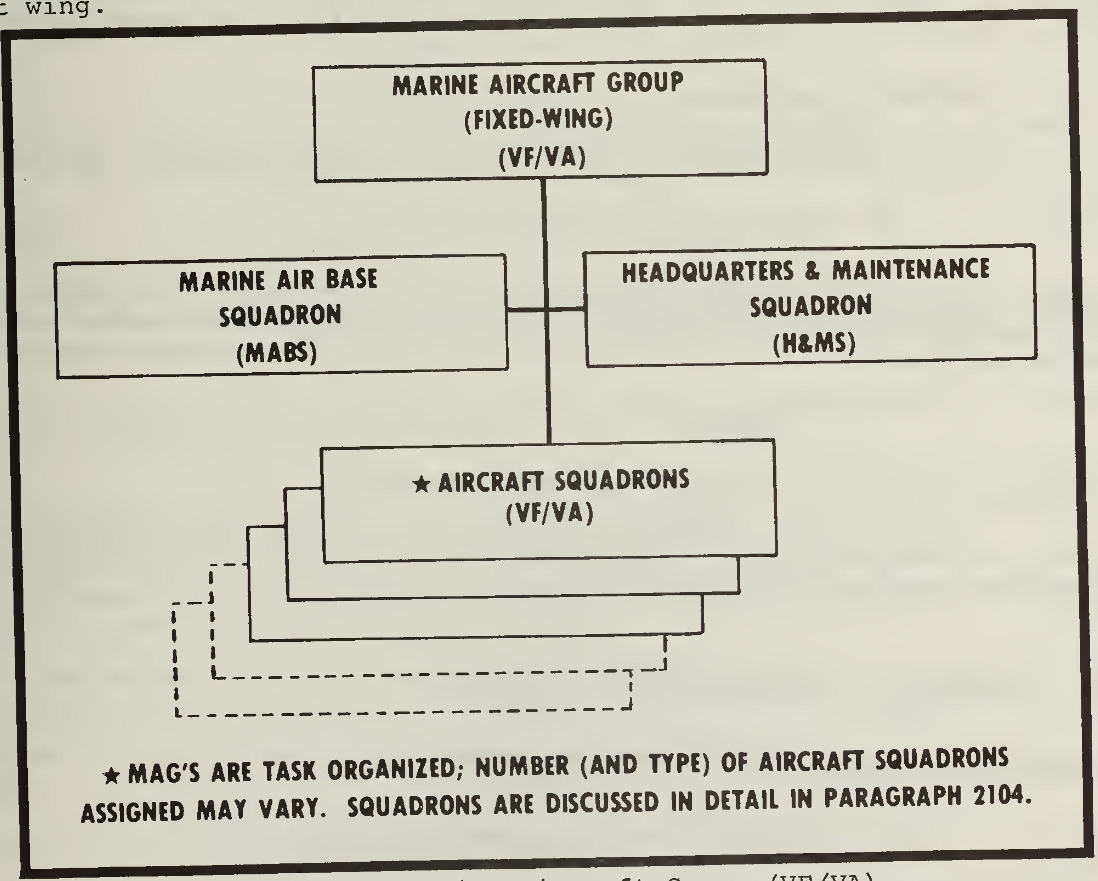

MARINE AIRCRAFT GROUP (FIXED-WING) (VF/VA)
MARINE AIR BASE SQUADRON (MABS)
HEADQUARTERS & MAINTENANCE SQUADRON (H&MS)
★ AIRCRAFT SQUADRONS (VF/VA)
★ MAG'S ARE TASK ORGANIZED; NUMBER (AND TYPE) OF AIRCRAFT SQUADRONS ASSIGNED MAY VARY. SQUADRONS ARE DISCUSSED IN DETAIL IN PARAGRAPH 2104.

Figure 1.--Marine Aircraft Group (VF/VA).

(10) Direct, collect, process, and disseminate intelligence information in coordination with appropriate agencies.

(11) Provide logistics and maintenance support for attached squadrons.

(12) Provide detachments for the support and maintenance of separately deployed units as required.

(13) Provide intermediate calibration (qualification) and repair services for all aeronautical test and measuring equipment assigned to MAG units.

(14) Provide supply, financial, and aircraft maintenance automatic data processing (ADP) support in accordance with current OPNAV, NAVSUP, and Marine Corps directives.

2104. MARINE SQUADRONS

The squadron is the basic tactical and administrative echelon of Marine aviation. The relationship of a squadron to other wing organizations is similar to the relationship of an infantry battalion to the Marine division. The squadron is normally commanded by a lieutenant colonel. Functions, missions, and tasks are assigned by the table of organization (T/O); it is the largest aviation unit in the Marine Corps organized with a fixed T/O.

a. Aircraft Squadrons

(1) Marine Attack Squadron, Marine Aircraft Group.--The Marine attack squadrons are of three types: A-4, AV-8, or A-6.

(a) Marine Attack Squadron (VMA)(A-4)

1 Mission.--The mission of the VMA(A-4) squadron is to attack and destroy surface targets under daylight visual flight rules (VFR) conditions, escort helicopters, and conduct such other air operations as may be directed.

2 Tasks

a Conduct close air support.

b Conduct armed reconnaissance, interdiction operations, and strikes against enemy installations, utilizing all types of conventional, nuclear, and chemical weapons compatible with assigned aircraft.

c Provide smoke laying, night battlefield or target illumination, and insecticide spraying.

d Maintain the capability of deployment or extended range operation employing aerial refueling.

e Perform organizational maintenance on assigned aircraft.

f Maintain the capability to perform emergency resupply mission compatible with assigned aircraft.

g Conduct armed escorts in support of helicopter operations.

h Maintain the capability of deploying and operating from aboard carriers, advanced bases, and expeditionary airfields (EAF's).

i Maintain the capability to operate during darkness and under instrument flight conditions to include ordnance delivery under the control of ASRT's.

j Conduct air defense operations within capability of aircraft assigned.

(b) Marine Attack Squadron (AV-8)

1 Mission.--The mission of a VMA(AV-8) squadron is to attack and destroy surface targets under daylight VFR conditions, escort helicopters, and conduct such other operations as may be directed.

2 Tasks

a Conduct close air support.

b Conduct armed reconnaissance, interdiction operations, and strikes against enemy installations, utilizing all types of conventional weapons compatible with assigned aircraft.

c Conduct air defense operations within capability of aircraft assigned.

d Maintain capability to operate during darkness and under instrument flight conditions to include ordnance delivery under the control of ASRT's.

e Maintain the capability of deployment or extended operation employing aerial refueling.

f Maintain the capability of deploying and operating from aboard carriers and other suitable seagoing platforms, advanced bases, expeditionary airfields, and remote tactical landing sites.

g Maintain capability to perform emergency resupply missions compatible with assigned aircraft.

h Conduct armed escort missions in support of helicopter operations.

i Perform organizational maintenance on assigned aircraft.

(c) Marine Attack Squadron (All-Weather) (A-6)

1 Mission.--The mission of the all-weather Marine attack squadron is to attack and destroy surface targets under all-weather

conditions, to escort helicopters, and to conduct such other air operations as may be directed.

2 Tasks

a Conduct close air support under all-weather conditions to include ordnance delivery under control of ASRT's.

b Conduct armed reconnaissance, radar search and attack, interdiction operations, and strikes against enemy installations, utilizing all types of conventional, nuclear, and chemical weapons compatible with assigned aircraft, under visual and all-weather conditions.

c Conduct air defense operations within capabilities of aircraft assigned.

d Perform smoke laying, night battlefield or target illumination, and insecticide spraying.

e Maintain the capability to deploy and extend the range of operation by employing aerial refueling techniques.

f Maintain the capability to deploy and operate from aircraft carriers, advanced bases, and expeditionary airfields.

g Maintain the capability to perform emergency resupply missions compatible with assigned aircraft.

h Collect and disseminate information on enemy units within the capability of assigned aircraft.

i Perform organizational maintenance on assigned aircraft.

(2) Marine Fighter/Attack Squadron, Marine Aircraft Group.--The Marine fighter/attack squadron is organized and equipped to perform a dual mission of all-weather interceptor and close air support under visual flight conditions. A VMFA squadron utilizes F-4 aircraft.

(a) Mission.--The mission of the Marine fighter/attack squadron is to intercept and destroy enemy aircraft under all-weather conditions, attack and destroy surface targets, escort friendly aircraft, and conduct such other air operations as may be directed.

(b) Tasks

1 Intercept and destroy enemy aircraft in conjunction with ground and airborne fighter direction.

2 Maintain the capability to attack and destroy surface targets with those conventional weapons compatible with assigned aircraft.

3 Provide fighter escort of friendly aircraft.

4 Perform visual reconnaissance.

5 Conduct close air support operations within the capabilities of assigned aircraft.

6 Maintain the capability of deploying and operating from aboard carriers, advanced bases, and short airfields for tactical support (SATS).

7 Maintain the capability of deployment or extended operation employing aerial refueling.

8 Perform organizational maintenance on assigned aircraft.

b. Support Squadrons

(1) Headquarters and Maintenance Squadron, Marine Aircraft Group

(a) Mission.--The mission of H&MS, MAG is to perform logistic and administrative support for units attached to the MAG.

(b) Tasks

1 Provide intermediate aircraft maintenance for units assigned to the MAG.

2 Perform intermediate and organizational aircraft maintenance.

3 Requisition, store, issue, and account for the appropriate supplies and equipment for supported units.

4 Provide administrative and supply support for the headquarters of the MAG.

5 Screen and repair aeronautical materials in need of rework, test, or check (condition codes B and E).

6 Maintain the capability to deploy as an integral unit or by elements in support of separately deployed units.

7 Conduct individual and unit training as required to qualify organic personnel and supported squadrons for performance of assigned missions and tasks.

8 Provide logistic, administrative, and training flight support for assigned squadrons.

9 Provide postal and disbursing service for assigned squadrons and personnel.

10 Provide base storage and distribution of classes V and V(A) ammunition to supported units.

11 Manufacture pyrogenic products as required for supported units.

12 Provide TAC(A) support if TA-4 aircraft is assigned.

(2) Marine Air Base Squadron, Marine Aircraft Group.--The organization of the wing contains an MABS in each of the tactical Marine aircraft groups. The internal organization and personnel strength of each of the MABS depends upon the type of group, fixed-wing or helicopter, and upon the number and type of tactical squadrons assigned to the parent group. Personnel and equipment for the operation of the Marine air traffic control squadron (MATCS) normally are assigned administratively to the MABS.

(a) Mission.--The mission of the MABS is to provide air base facilities and services (except airfield construction) for the Marine aircraft group or to supplement air base facilities and services provided by a station or facility when based thereon.

(b) Tasks

1 Conduct airfield operations and air traffic control as required for supported units.

2 Provide camp construction, utilities, and maintenance as required for supported units.

3 Provide mess facilities as required for MAG organic units.

4 Provide base storage and distribution for classes I, III, and III(A) supplies to supported units.

5 Provide and operate the base air freight terminal.

6 Maintain the capability to deploy as an integral unit and by elements in support of separately deployed units.

7 Conduct individual and unit training to qualify personnel of MABS and supported squadrons in the performance of required tasks and missions.

8 Provide weather service support as required for supported units.

9 Provide internal and external voice and record communication to the group within capability of communications equipment assigned.

(3) Marine Air Support Squadron, Marine Air Control Group (MASS, MACG).--The Marine air support squadron is organized and equipped to install, maintain, and operate ground communications-electronics facilities required in the operation of the direct air support center (DASC) and three helicopter-transportable air support radar teams. The personnel strength of the squadron includes the necessary aviators, aviation ground officers, and assistants to provide technical direction for aircraft. The squadron is self-supporting in logistic and fiscal functions and carries adequate supplies for independent deployment or for operations at locations apart from its parent air control group.

(a) Mission.--The mission of the MASS is to provide facilities for the control of aircraft operating in close or direct support of Fleet Marine Force operations.

(b) Tasks

1 Receive and coordinate requests for air support.

2 Provide three ASRT's to operate and maintain the facilities required for electronics control of close and direct air support operations.

3 Maintain the capability to accomplish a mission in a situation requiring displacement in echelon.

4 Provide for the operation of the helicopter direction center (HDC).

5 Provide fourth echelon maintenance of Marine Corps-furnished radar equipment and aviation peculiar communications-electronics material items and perform third echelon maintenance of other communications-electronics items and generators, except single sideband.

2105. BATTALIONS, BATTERIES, COMPANIES, AND UNITS

There are two aviation units directly involved in offensive air support. The Marine air tactical control unit which controls aircraft around the home field, and the Marine wing weapons unit (MWWU) which assists the squadrons in the employment of special weapons.

a. Detachment, Marine Air Traffic Control Squadron.--Within the MACCS, expeditionary terminal control facilities are required and the MATCS is and operational facility designed to handle that requirement.

(1) The mission of the MATCS is to direct and control air traffic, including landings and takeoffs, within a designated air traffic control area under all-weather conditions.

(2) See paragraph 2203, for a detailed discussion of the MATCS.

b. Marine Wing Weapons Unit, Marine Wing Support Group (MWSG)

(1) The MWWU must be attached to a group or squadron for administrative and logistic support.

(2) The mission of the MWWU is to provide support for the Marine aircraft wing in accordance with the missions and tasks promulgated in MCO 5440.2(_).

Section II. MARINE AIR COMMAND AND CONTROL SYSTEMS (MACCS)

2201. GENERAL

The ranges, speeds, and types of aircraft employed in support of an amphibious operation require that their control be directed from a high command level. The control of aircraft is more detailed and covers a much greater geographical area than other types of military control. Time and space factors preclude subdividing an extensive area into small zones of action as in the case of ground operations. High-speed aircraft cross a regimental or battalion zone of action in a matter of seconds. Because the speed and distances involved in dealing with aircraft are substantial and the necessity for immediate inflight response to directives and orders in air operations, it is paramount that the controlling commander communicate directly with individual aircraft flights through a centralized control system. For example, a situation may develop in which aircraft airborne on a prebriefed attack mission must be diverted to engage a newly discovered target threatening the landing force. Time would not permit the requisite change in orders to be transmitted through a group commander even though the aircraft are organic to the group. It is in response to this timesaving need that coordination and control of air operations over a relatively broad area by a single commander is essential. This commander uses a system through which his authority is diffused and which acts for him in the actual control of aircraft. As is implied in the foregoing, all aircraft operating in the objective area are not controlled from a single location. The air control system has subagencies, all of which exercise this detailed control of aircraft. The Marine air command and control system, as the total system is called, permits centralized coordination and supervision of air operations at the highest level, while incorporating decentralization of control authority to subordinate agencies. See figure 2 for the air command and control agencies and parent units found in the MACG. Figure 3 is an example of the MACCS deployed.

2202. CONTROL OF AIRCRAFT AND MISSILES

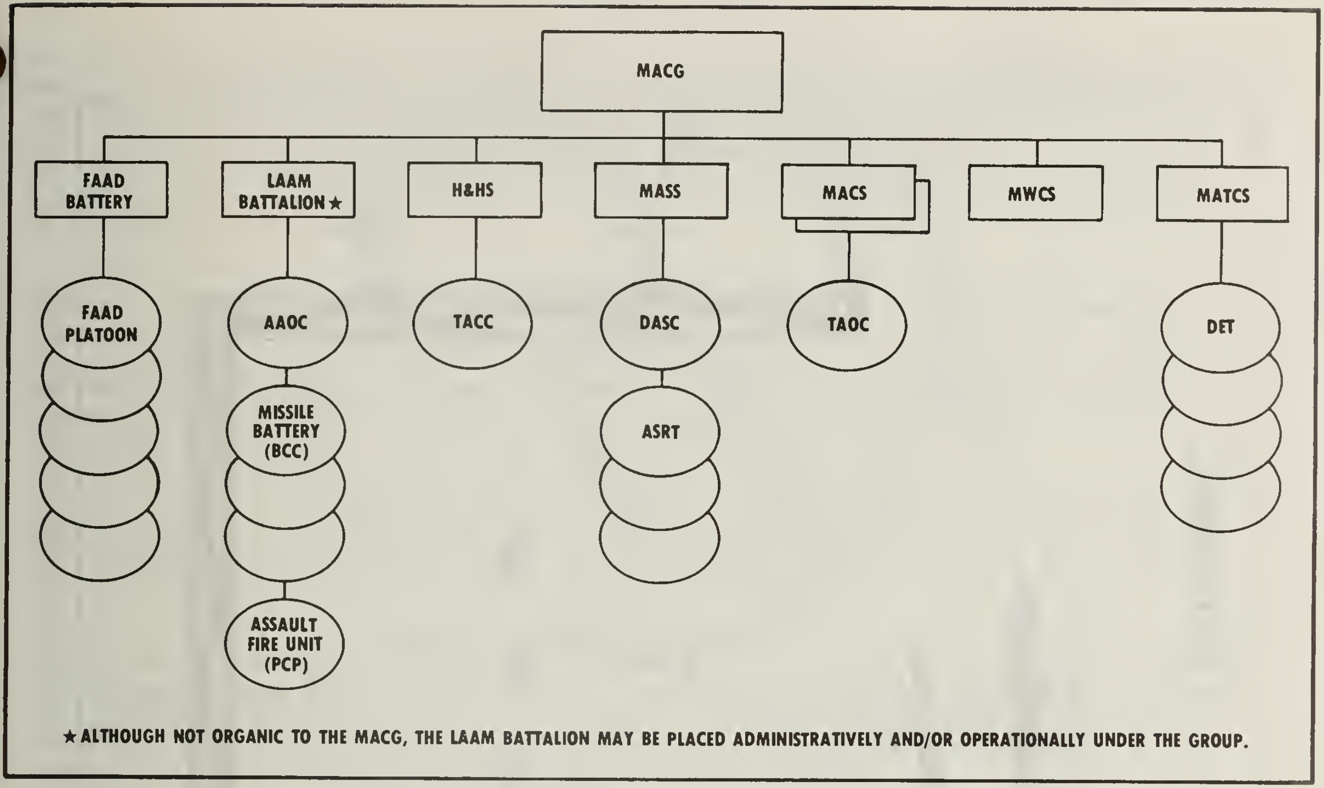
a. Control.--This aspect of Marine aviation is crucial since it integrates all aircraft activity into a single, coordinated system. It provides for the exercise of authority over, and direction of, air support elements during the conduct of operations. Through the MACCS, control is exercised to perform the following for all aviation functions:

(1) Airspace and air traffic control.

(2) Employment of aviation assets and weapon systems.

(3) Selection, coordination, and integration of the agencies of the MACCS for the execution of all Marine aviation functions.

b. Control of Offensive Air Support.--FMFM 5-1, Marine Aviation, contains a complete discussion of the aspects of control as applied to all aviation functions. This paragraph will restate pertinent aspects for offensive air support. Definitions are found in chapter 1, section II. Control of offensive air support varies depending upon the category: close air support or deep air support. As defined, the detailed integration requirements associated with close air support make its control more intricate than deep air support.



★ALTHOUGH NOT ORGANIC TO THE MACG, THE LAAM BATTALION MAY BE PLACED ADMINISTRATIVELY AND/OR OPERATIONALLY UNDER THE GROUP.

Figure 2.--Marine Air Control Group.

(1) Air Direction.--Air direction tasks for both preplanned close air support and deep air support are similar. Preplanned close air support and deep air support require air direction only in the sense that launch times, proper terminal control assignments, bomb damage assessment reports, and aircraft recoveries are monitored. For immediate close air support, however, air direction requirements are more detailed; e.g., assets must be identified and schedules must be adjusted. The major differences between preplanned close air support and deep air support are time-sensitive factors and the extent of fire support coordination required. In close air support, the response times from both the MACCS and the aircraft themselves are short and the area covered by fixed-wing attack aircraft en route to and while on-target at low altitudes is large. Both have a considerable impact upon surface fires.

(2) Air Control

(a) Close Air Support.--Air control of close air support is a complicated task. Air control of preplanned and immediate close air support is similar, since ordnance delivery is a terminal control agency function and varies only when aircraft have arrived on station. En route, flight following is normally accomplished. Rendezvous and assumption of control by a terminal controller follows.

1 The MACCS terminal controller may be a forward air controller from the tactical air control party, an airborne foward air controller, or a naval aviation observer. Airborne controllers (AFAC's or NAO's) are preferred for close air support control as they are better able

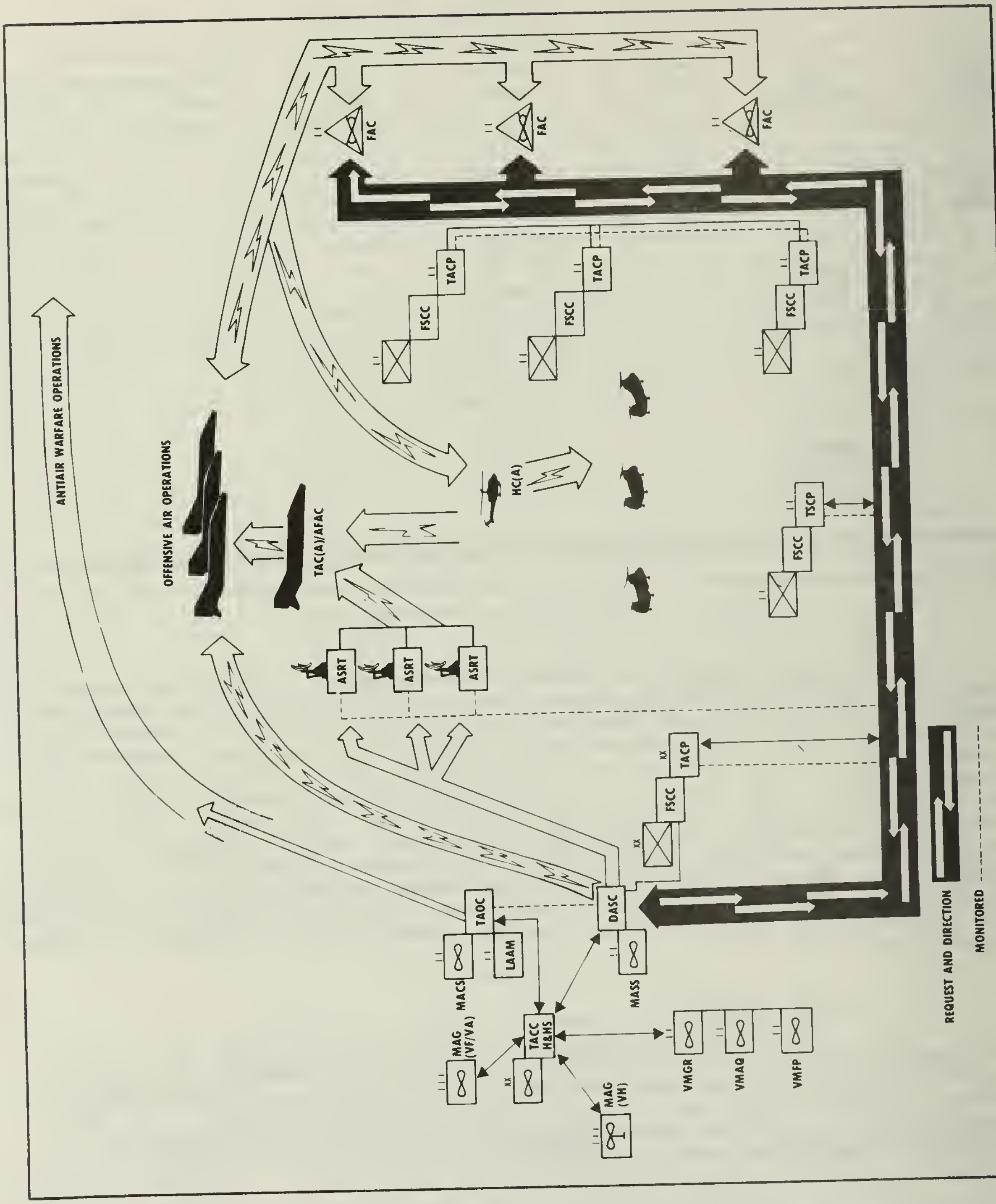


Figure 3.--Marine Air Command and Control System, Deployed.

to identify friendly troop positions from an airborne vantage point. However, in a high threat environment, the vulnerability of airborne controllers to enemy surface-to-air weapons may be so great as to preclude their use. In that case, the FAC will be used and delivery techniques designed to increase the survivability of delivery aircraft will be incorporated. In either event, a critical requirement for close air support is the identification of friendly positions prior to delivery.

2 Electronic aids may be utilized to effect terminal control. One method is a radar course direction facility/agency which, through precision radar control, allows for ordnance delivery in reduced visibility conditions and from altitudes normally considered safe from man-packed surface-to-air weapons. A second method utilizes TACP operated ground-to-air beacons, employed in concert with appropriately configured aircraft, to determine both friendly and target locations.

3 Whatever methods of terminal control are used, fire support coordination remains the responsibility of the fire support coordinator (FSC). This coordination is best accomplished prior to the arrival on station of the close air support aircraft.

(b) Deep Air Support.--Because deep air support is conducted at ranges not requiring detailed integration with ground units and surface fire support units, control consists mainly of flight following to a hand-over point. This hand-over is to either terminal control by an airborne controller (AFAC or leader), or transfer of control to another agency for missions in support of forces external to the MAGTF.

2203. CONTROL AGENCIES

a. Tactical Air Command Center (TACC).--The TACC is the senior MACCS agency. The supervision, coordination, and general control of all tactical air operations in the MAGTF area of responsibility are conducted by the TACC. It also provides the Marine tactical air commander (TAC) with the means to direct and coordinate organic aviation with other services. The TACC exercises command and control of the entire MACCS through agencies both organic and nonorganic to the MACG. These agencies include the DASC and ASRT's of MASS, one or more TAOC's from the MACS's, the TACP's of the Marine division, and the MATCS's to effectively fulfill its responsibility for air direction and command of tactical air operations, current intelligence information regarding pertinent aspects of the air and ground situation is collected by the TACC. General situation information is displayed to enable the TAC or his designated representative to rapidly analyze and manage aviation assets. Control of the airspace is exercised through the TAOC's. Control of offensive air support is exercised through the DASC. This includes the authority to order the launch of reserve aircraft for priority missions. The TACC is equipped with the communication links necessary to gather and disseminate the information necessary for rapid shifts of aviation assets as the air situation requires. The role, tasks, and duties of the TACC are as follows:

(1) Role.--The role of the TACC is to function as the senior MAGTF air command and control agency and to establish the operational command post of the Marine air command and control system from which the TAC can supervise, direct, control, and coordinate all MAGTF tactical air operations.

(2) Tasks

(a) To maintain complete information on the air situation, including that ground combat information essential to the air effort.

(b) To manage all aircraft in the objective area to ensure the most balanced and properly weighed utilization of assets for tactical air operations.

(c) To oversee the operations of subordinate MACCS agencies to preserve economy and unity of effort in the execution of the TAC's air plans.

(d) To serve as the operational point of contact between the MACCS and external air control systems.

(e) To prescribe emission control (EMCON) conditions in the objective area.

(f) To prescribe succession of command and control responsibilities within the MACCS to compensate for any serious degradation within a component agency.

(3) Duties

(a) Coordinating the utilization of aircraft by the DASC.

(b) Diverting aircraft from scheduled missions to meet other priorities.

(c) Briefing pilots of diverted aircraft, as required.

(d) Establishing alert conditions for ground alert aircraft.

(e) Providing subordinate control agencies with appropriate flight schedules, identification signals, aircraft call signs, alert conditions, and aircraft availability.

(f) Maintaining current status displays of all friendly air operations and detected threats.

(g) Providing the focal point for the dissemination of tactical data information between air control agencies, both internal and external to the MACCS.

b. Tactical Air Direction Center (TADC).--The TADC is an air operations facility subordinate to a TACC (USN/USAF/USMC). The TADC acts to coordinate and direct all air operations in a specified portion of the objective area. The TADC is normally identical in organization, facilities, and capabilities to a TACC. A TAOC can also function as a TADC for limited periods. The essential difference between a TACC and the TADC is the amount of airspace for which each is responsible and the scope of their assigned tasks. When the MAGTF commander has overall responsibility for control of air in the objective area, he establishes a TACC. If, however, overall responsibility rests external to the MAGTF, the commander establishes a TADC for his sector of responsibility. When it becomes necessary to organize an amphibious task force into subordinate task groups, each task group may employ a TADC (afloat) for control of air operations in its sector of responsibility. Overall control is retained by the commander amphibious task force (CATF) through the task force TACC. The MACCS TADC may be viewed as a similar "task group" agency ashore with responsibility for air operations in the landward sector. When the commander landing force is capable of assuming control and when approved by the CATF, all control of air operations (in the objective area) passes ashore. The primary control agency, previously designated a TADC, becomes the TACC. The CATF's TACC reverts to the status of a TADC (afloat).

c. Tactical Air Operations Center (TAOC)

(1) General.--The TAOC is the subordinate operational element of a Marine air command and control system designed for control of a sector, en route air traffic, and air defense operations. The TAOC is placed under the control of a TACC/TADC ashore or afloat, depending upon the specific phase of a particular operation. Because of its surveillance radar capabilities, it is the primary source of radar control for all aircraft in its sector of responsibility. The TAOC detects, acquires, and tracks targets in its assigned area of responsibility and provides an up-to-date display of the air situation. Tactical data is exchanged by means of digital and/or voice communications with adjacent TAOC's, the TACC/TADC, and other agencies.

(2) Role.--The offensive air support role of the TAOC is to provide navigational assistance to friendly aircraft in the accomplishment of support missions. Additionally, the TAOC functions as the alternate TACC/TADC when directed.

(3) Tasks

(a) Recommending geographic sectors/subsectors of responsibility for itself and component elements.

(b) Detecting, identifying, and classifying all aircraft within its sector of responsibility.

(c) Maintaining a summary display of the air situation within its capabilities and disseminating appropriate elements of this information to other designated agencies.

(d) Coordinating and executing emission control conditions as set by higher headquarters.

(e) Operating as a TACC/TADC for limited periods.

d. Direct Air Support Center

(1) General.--The DASC is the principal air control agency responsible for the conduct of tactical operations directly supporting ground forces. It functions in a decentralized mode of operations, but is directly supervised by the TACC/TADC. It is normally the first major air control agency ashore and normally lands in the same category as the senior ground combat element fire support coordination center (FSCC); e.g., scheduled or on-call waves. The DASC coordinates close air support strikes, assault support, and certain air reconnaissance missions. It also disseminates friendly and enemy aircraft information to the forward area air defense

(FAAD) battery to ensure effective employment of the Redeye missile system and coordinates the timely distribution of air assets assigned by the TACC (afloat) and helicopter direction center for allocation to appropriate terminal control agencies. These terminal control agencies include the FAC, the TAC(A), the helicopter coordinator (airborne) (HC(A)), and the ASRT's. The DASC collocates with the senior ground combat element FSCC and works closely with this agency to ensure the coordination with other supporting arms. Because of the necessity for detailed and continuous communications and coordination between the DASC and the FSCC, these agencies, where possible, should be collocated. In any case, when displacing either ashore or elsewhere, key DASC personnel should accompany personnel of the ground element to advise and assist in site selection. The DASC, equipped and operated by the MASS, may displace by echelon to preserve operational continuity. In addition to controlling and coordinating direct air support aircraft employment, the DASC receives ground and air intelligence information and disseminates this information to the TACC/TADC, TAOC, and FSCC. The DASC also coordinates the movement and identification of friendly aircraft and responds to the TAOC's requirement for position information of aircraft under its control.

(2) Role.--The role of the DASC is to provide the means for processing direct air support requests, to coordinate aircraft employment with other supporting arms, and to control assigned aircraft within the procedures of area airspace control.

(3) DASC Configurations.--FMFM 5-1, Marine Aviation, contains a complete discussion of DASC configurations and situations appropriate for their use.

(4) Tasks

(a) Receives fragmentary operation orders and coordinates scheduled preplanned close air support.

(b) Receives, processes, and coordinates ground force requests for immediate or on-call air support.

(c) Adjusts preplanned schedules and diverts airborne assets in accordance with the priorities of the continuing ground combat situation and degree of decentralized authority assigned by the TACC/TADC.

(d) Coordinates the execution of offensive air support missions with the activity of other fire support means through the appropriate FSCC to ensure maximum aircraft safety and minimum mutual interference.

(e) Refers all conflicts in supporting arms activity to the appropriate FSCC for resolution consistent with the mission of supported units.

(f) Provides an operational point of contact for both user agencies and close air support aircraft for the resolution of conflicting priorities and the coordination of efforts.

(g) Serves as the ground combat element's operational point of contact to ensure close air support response to changing ground tactical situations and a possible reevaluation of priorities.

(h) Receives and disseminates to the ground element's air representative all pertinent tactical intelligence and information reported by aircraft performing close air support air missions.

(i) Assigns control of DASC aircraft to subordinate terminal control agencies such as TACP's, TAC(A)'s, AFAC's, NAO's, ASRT's, and landing zone coordination points (LZCP's).

(j) Provides requesting aircraft and other air control agencies with appropriate advisory information for the conduct of safe flight. Such information includes airstrikes, TPQ drops, enemy antiaircraft activity, and airspace coordination areas.

(k) Assigns general routes of aircraft approach and retirement.

(l) Records, monitors, and displays information on the planned and existing state of offensive air support missions and advises TACC, TADC, and FSCC as required.

e. Air Support Radar Team

(1) General.--The ASRT is a terminal air support control agency subordinate to the DASC which provides precision control during all weather conditions. The ASRT employes a radar course directing central (RCDC) which consists of a precision radar and associated computer equipment designed to accurately position aircraft without visual reference to the earth's surface. Aircraft are guided to a point in space from which released bombs impact on a predetermined target. This is accomplished by using radar derived positional information and manually inserted target position information, wind data, ballistics data based upon the type ordnance being used, ordnance ejection velocity, speed, and altitude of the aircraft. In order to accurately compute this radar positional information, the RCDC must be established by an accurate land survey. There are three ASRT's organic to the MASS of the MACG. They are organized as highly mobile air control facilities and operate in support of the MAGTF.

(2) Role.--The role of the ASRT is to provide day/night all-weather precision control of aircraft operating in support of MAGTF operations.

(3) Tasks.--The principal task of the ASRT is to provide precision control of strike aircraft for medium and high altitude level bombing in support of the MAGTF. The ASRT also performs the following:

(a) Receives and computes target data for bombing missions.

(b) Briefs aircrews on the mission requirements.

(c) Coordinates with the TAOC or other appropriate control agencies to receive radar hand-overs of mission aircraft.

(d) Keeps the DASC fully advised as to ASRT operational status and conduct of operations.

(e) Notifies the DASC of the results of each mission.

(f) Positions aircraft at a geographic position which assists or permits the aircraft to accomplish a designated mission. An example is the positioning of aircraft for loft bombing or to a pushover point for air-to-surface missile delivery.

f. Marine Air Traffic Control Agencies.--Within the MACCS, expeditionary terminal air traffic control facilities are required for aircraft takeoffs and landings. The MATCS is an operational facility designed to handle the type and amount of air traffic found within an MAG. Prior to the entry of the MAGTF into the amphibious objective area, the area airspace control authority, in concert with indigenous national agencies if appropriate, will assign control areas and airspace control area procedures for air traffic control. Once ashore, the MATCS will commence operations in accordance with these general relationships, but operating primarily according to the policies of the TAC. In this situation, the MATCS joins with other MACS to provide continuous control of aircraft from launch to recovery.

(1) Role.--In order to provide the required functions for terminal and limited en route control, the MATCS is organized into three operational sections: approach control, ground-controlled approach (GCA), and control tower.

(2) Tasks.--The following general tasks are performed by MATCS during expeditionary operations:

(a) Provides for the safe, orderly, and expeditious flow of air traffic arriving within, and departing, the designated control area or control zone under all-weather conditions.

(b) Provides flight identification information on transiting or incoming friendly aircraft.

(c) Controls the expeditious launch of assigned ground alert aircraft.

(d) Identifies, reports, and assists inflight emergencies.

(e) Acts as the control agency for initiating designated search and rescue operations.

(f) Operates precision radar control facilities to provide for the safe recovery of friendly aircraft during conditions of reduced visibility.

(g) Coordinates with the local TAOC to ensure continuity of radar control for aircraft departures and recoveries.

(h) Establishes arrival and departure routes, procedures, and the traffic holding points (fixes) within the control area.

(3) MATCS Agencies.--MATCS operational subsections perform the following tasks:

(a) Approach Control.--Approach control is the controlling authority within the MATCS for all flights within the control area during instrument flight rules (IFR) conditions. During visual flight rules (VFR) conditions, the control authority is mutually shared by the control tower and approach control. The following tasks are performed by approach control:

1 Receives and processes flight plans and aircraft from adjacent air traffic control facilities.

2 Receives and handles aircraft recovery and departure.

3 Forwards necessary flight plan data to the TACC/TAOC.

4 Provides flight assistance as requested to include weather advisories, status of navigational aids, radar availability, and emergency assistance.

(b) Local Control.--The control tower is responsible for issuing information and clearances to aircraft operating in the control zone during VFR conditions in the airfield movement area. The control tower function is formally described as local control. Local control executes the following tasks:

1 Provides aircraft in the airport traffic area with information concerning airfield weather conditions, air traffic, active runway, altimeter setting, and other special information to ensure safety-of-flight.

2 Maintains adequate flight separation between departures and arrivals.

3 Receives information on IFR arrivals from approach control and relays proposed IFR departure flight plans to approach control. Once approved, it relays the approval/modification to the departing aircrew.

4 Ensures compliance with procedures governing traffic in the airport traffic area through visual surveillance.

(c) Ground Control Approach.--The GCA section is responsible for the effective radar control of aircraft that have been assigned by approach control or local control. This control normally covers the transition from an altitude assigned by approach control to termination by landing. In so doing, they perform the following tasks:

1 Provides precision radar control to aircraft landing under conditions of low ceiling and/or low visibility.

2 Provides air surveillance radar (azimuth and slant range only) letdowns to aircraft when appropriate.

3 Coordinates with the TAOC for ground controlled intercept (GCI)/GCA hand-overs.

4 Provides the TAOC aircraft position information when requested and when surveillance radar of approach control is inoperative.

g. Tactical Air Control Parties

(1) General.--The TACP is "a subordinate operational component of a tactical air control system designed to provide air liaison to land

forces and for the control of aircraft." TACP's establish and maintain facilities for liaison and communications between supported units and appropriate control agencies, inform and advise the ground unit commander on the employment of supporting aircraft, and request and control air support missions. There are two types of tactical air control parties. The first type is organic to the infantry battalion, and the second type is organic to the infantry regiments and division. The principal difference between the two types of TACP's is that the battalion TACP has two forward air control parties, while the regimental and division TACP's have none.

(2) Tasks

(a) Provide liaison and communications between the commander of the ground unit to which assigned and the appropriate air control agency.

(b) Provide the commander of the ground unit current information on the employment and availability of aircraft assigned to the support of his unit.

(c) Advise the ground unit commander and staff on matters concerning close air support.

(d) Prepare and forward requests for close air support in accordance with instructions received from the unit to which attached.

(e) Relay pertinent information to the tactical air control agency.

(f) Exercise control of aircraft during the terminal phase of close air support missions to ensure accuracy of weapons delivery and minimize danger to friendly troops.

(3) Division TACP.--The division TACP consists of 2 air control officers and 11 enlisted communication personnel. The senior air control officer normally performs the duties of the commander of the air and naval gunfire platoon, communication company, of the headquarters battalion. The air control officers assist the division air officer by monitoring all immediate air support requests from subordinate units, supervising the operation of aviation nets in the FSCC, and keeping the fire support coordinator advised of the general air situation and specific requests of subordinate units.

(4) Regimental TACP.--The regimental TACP is composed of one officer called the regimental air officer, assigned to the regimental operations section, and four enlisted communication personnel from the communication platoon of headquarters company. The air officer acts in a dual capacity as a special staff officer to the regimental commander in regard to all aviation matters and as the officer in charge of the regimental TACP. In the latter capacity, he may act as an air controller actually controlling an airstrike. He coordinates and consolidates all preplanned air support requests from subordinate units with the regimental FSC. He coordinates, as necessary, immediate air support requests from subordinate TACP's.

(5) Battalion TACP.--The battalion TACP's are composed of 3 officers and 12 enlisted communication personnel. The senior naval

aviator/naval flight officer functions as the battalion air officer and each of the other two officers is the leader of a FAC party.

(a) Air Officer.--The battalion air officer duties are similar to those of the regimental air officer. He normally remains with the battalion command group when deployed and functions as chief advisor to the battalion commander on all air operation matters. The battalion air officer supervises the training and operation of the two battalion FAC parties.

(b) Forward Air Control Parties.--The two FAC parties generally accompany the frontline companies of the battalion during all phases of the amphibious operation. The forward air controller controls aircraft executing missions in support of the battalion. The FAC maintains positive ground-air radio communications with assigned support aircraft from a forward position which permits him to observe and direct each aircraft in its run on the target. This control provides for accurate ordnance delivery and maximum troop safety. The primary duties of the FAC party are:

1 To operate well forward with the assault units of the battalion so as to observe and locate targets of opportunity.

2 To advise the supported company commander on the proper employment of air.

3 To direct airstrikes against targets, as requested.

4 To assess damage to those enemy targets after a close air support mission has been executed.

5 To gather and report all information of an intelligence nature.

6 To stay abreast of the supported unit's plans, position, and needs.

7 To stay abreast of the enemy situation, selection of targets, and location of friendly units.

(6) Division Air Section.--The division air section consists of four naval aviators/naval flight officers and is headed by a colonel. Although listed here, it is not a part of the division TACP. (Personnel from the division air section may augment the division TACP in the FSCC as necessary and the division air officer has staff cognizance over TACP operations.) The division air officer does, however, perform the following tasks normally performed by the TACP's:

(a) Provide the division commander current information on the employment and availability of aircraft assigned to the support of the division.

(b) Advise the division commander, his staff, and commanders of those elements not having TACP's, on matters concerning air support.

(c) Prepare and forward requests for preplanned close air support in accordance with instructions received from the division commander.

Section III. EQUIPMENT AND SYSTEMS

2301. GENERAL

Because of the multithreat environments encountered in military operations today, Marine Corps aircraft must be equipped with highly developed, sophisticated systems. The complex aircraft and related equipment used in offensive air support require highly skilled personnel both in the air and on the ground. The unique role of the Marine Corps as an amphibious force in readiness has created a need for correspondingly unique equipment and systems.

2302. AIRCRAFT

a. Fixed-Wing Attack

(1) AV-8.--This is a light attack, single-engine, jet aircraft. The AV-8 is designed for conventional ordnance delivery during daylight and visual flight conditions. It is capable of vertical takeoff and landing (VTOL) with a limited ordnance payload, and short takeoff and landing (STOL) operations at maximum gross weights. The AV-8 is suitable for operations aboard land or sea bases. Like a helicopter, it may operate from an LPD, LHA, LPH, or CVA. Because of its unique capacity to perform VTOL and STOL operations, it is extremely versatile and provides a considerable improvement in the close-in support and general attack abilities of the MAW. The AV-8 is operated by VMA squadrons. (See fig. 4.)

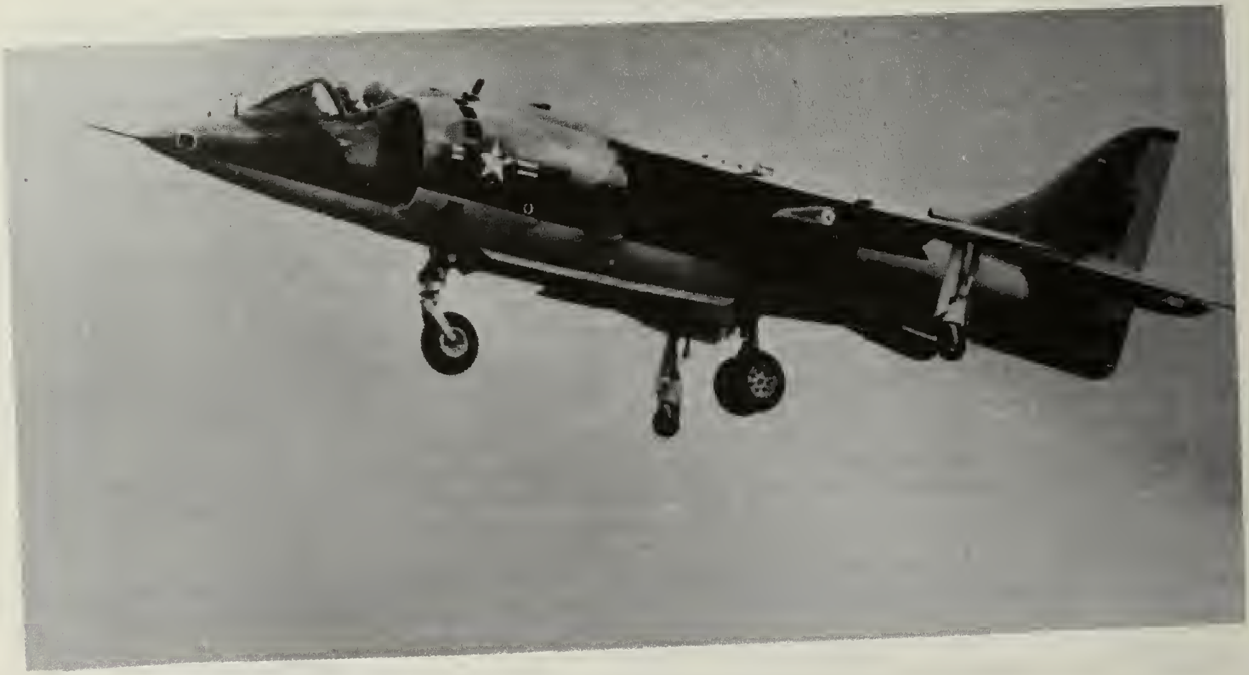


Figure 4.--AV-8.

(2) A-4.--The A-4 is a light attack, single-engine, jet aircraft. There are numerous models of the A-4 aircraft in service use. The A-4E/F/M and the TA-4F are currently employed by the Marine Corps, although the A-4E's and A-4F's are only employed in the Marine Corps reserve squadrons. All models of the A-4 have two internally mounted 20mm cannons. The A-4E/F and A-4M are single place, while the TA-4F is a two-place aircraft. The A-4M is the newest model in service with the Marine Corps. It has a vastly improved avionics package, (including VHF/FM radio). Redesigned weapons delivery control panel, more powerful engine, and a drag chute which allows it to operate from shorter airfields than earlier models. The A-4 is designed for the delivery of conventional and nuclear weapons during hours of daylight and under visual flight conditions; however, it also has the capability of delivering conventional ordnance, under the control of the TPQ-10 radar, using either manual or automatic release modes at night and during instrument weather conditions. Marine A-4 aircraft are used primarily for close air support, medium range interdiction missions, and helicopter escort during daylight and visual flight conditions. It is operated by VMA squadrons. (See fig. 5.)

(3) A-6.--The A-6 is a medium sized, two-engine, two-place, low altitude, all-weather attack aircraft. A central solid-state computer, search radar, doppler and inertial navigation systems provide an integrated attack-navigation capability which gives the aircraft the ability to locate, track, and attack moving targets and fixed targets in all-weather conditions. A forward air controller (FAC) equipped with a radar beacon (RABFAC) can transmit additional input to this on-board computer system. The bombardier/

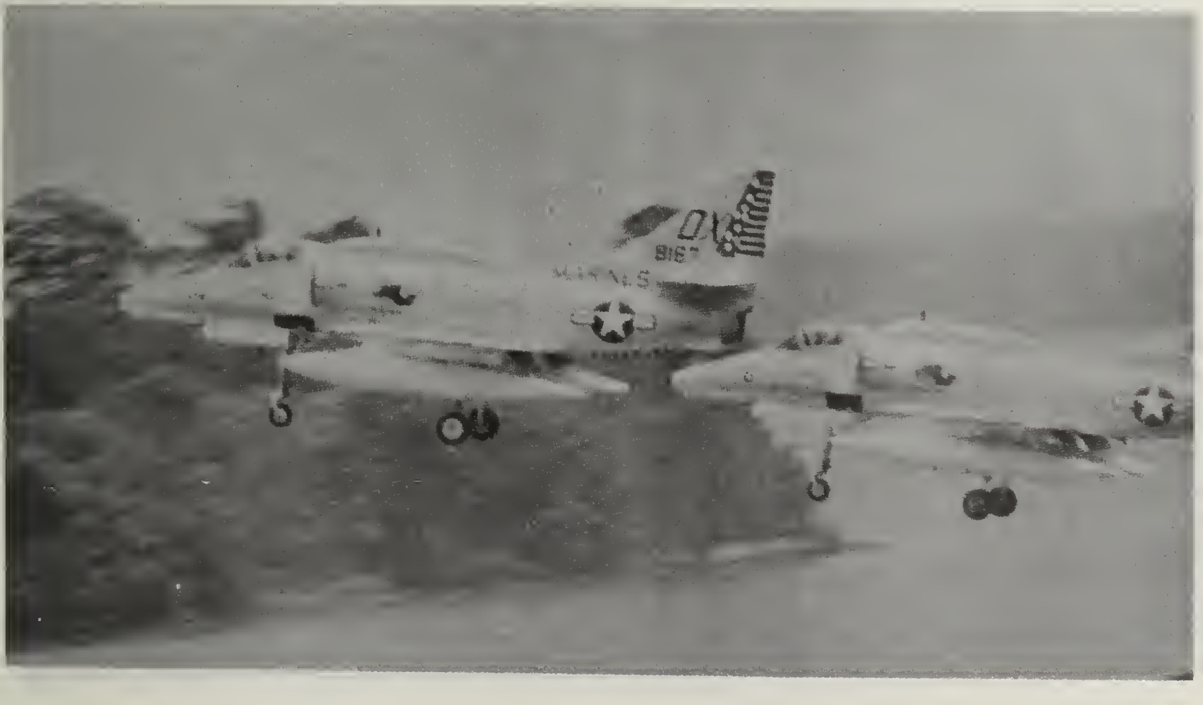


Figure 5.--A-4.

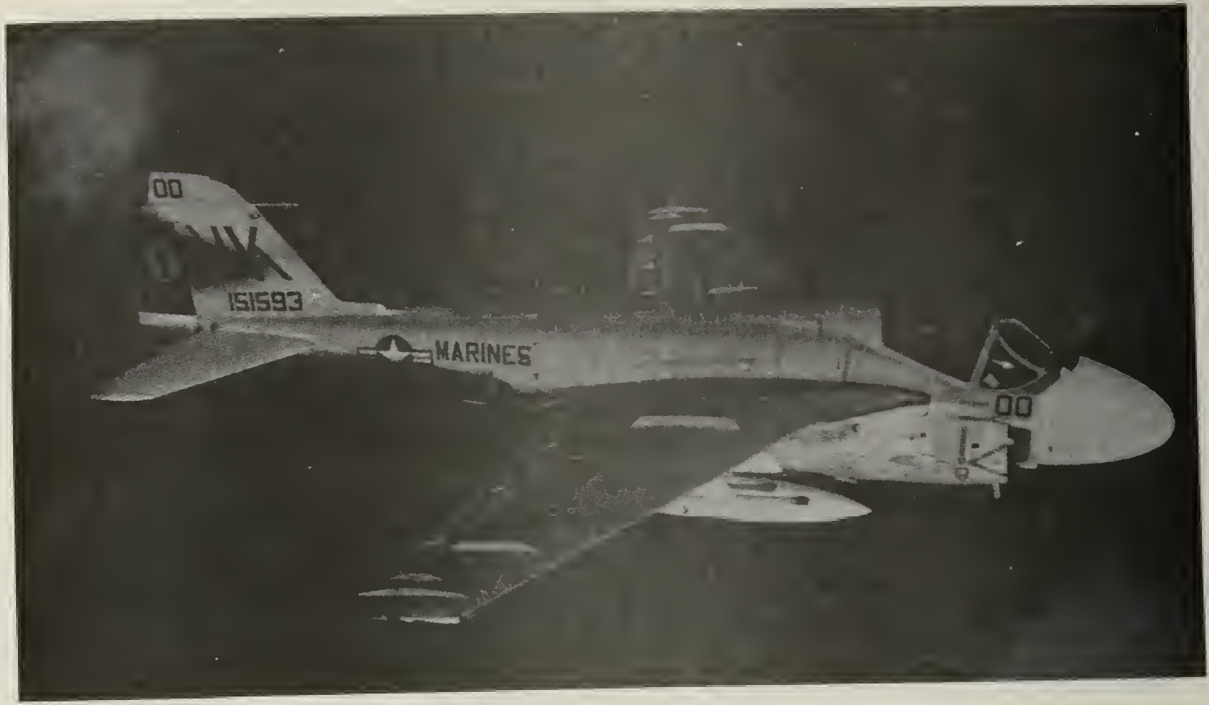


Figure 6.--A-6.

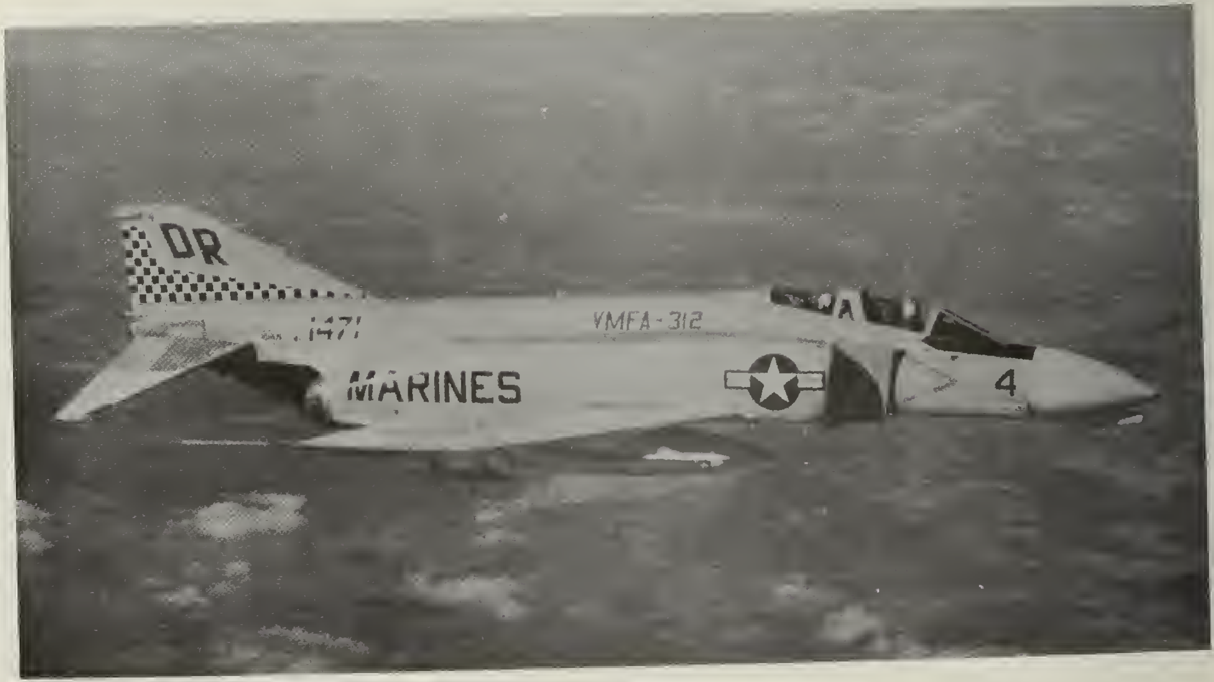


Figure 7.--F-4.

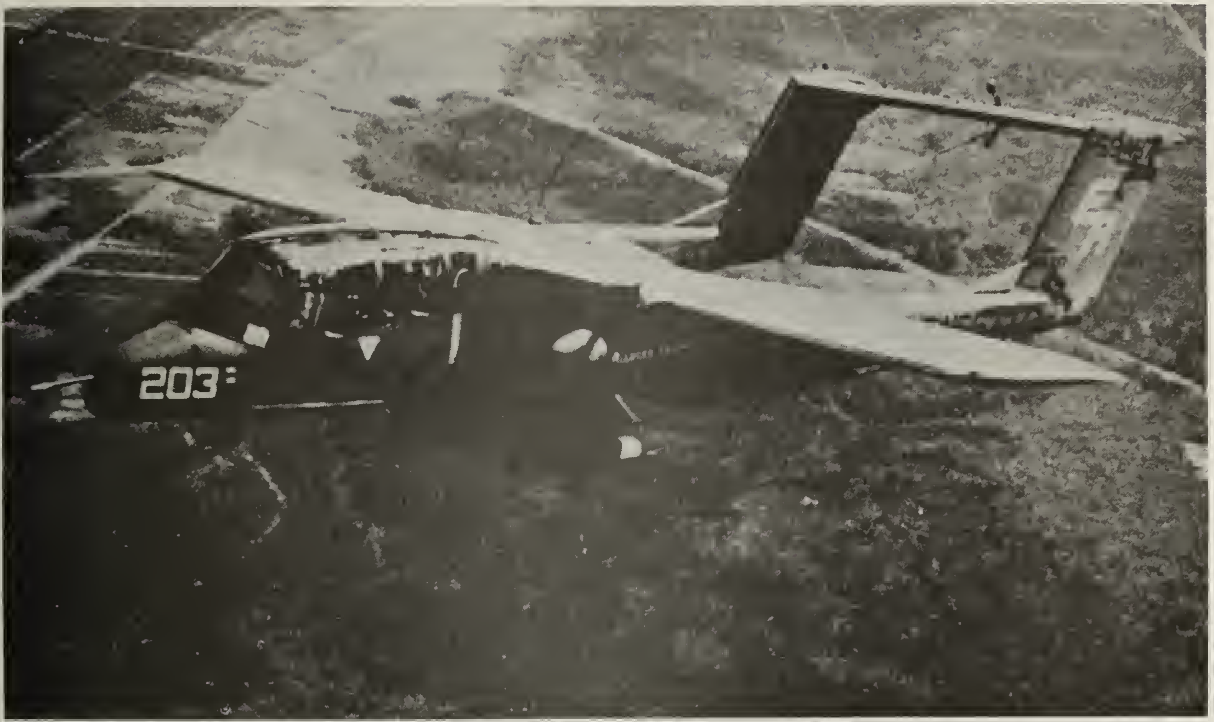


Figure 8.--OV-10.

navigator operates the system and provides pilot displays of contact analogue, terrain clearance, attack, and horizontal situation information in integrated form. It is operated by VMA(AW) squadrons. (See fig. 6.)

b. Fixed-Wing Fighter.--The F-4 is a supersonic, two-place, two-engine, all-weather fighter/attack aircraft. It has a retractable air refueling probe and a drag chute for reducing landing roll distances. The models currently employed by the Marine Corps are the F-4J and the F-4N. The F-4N is configured with the visual target acquisition system (VTAS) and sidewinder expanded acquisition mode (SEAM) which greatly enhances its air combat capability. The primary mission of the F-4 is the all-weather intercept of enemy aircraft. It has a secondary mission of attacking surface targets during daylight and visual flight conditions. F-4 aircraft are oprated by VMFA squadrons. (See fig. 7.)

c. Fixed-Wing Reconnaissance.--The OV-10 is a two-engine, two-place, short takeoff and landing aircraft. It is powered by two T-76 turboprop engines. Four 7.62mm guns are mounted in the ordnance sponson located under the main fuselage. The fuselage cargo compartment has a cargo bay accommodating six fully equipped combat troops. The primary mission of the OV-10 is visual observation and reconnaissance. It can serve as a vehicle for artillery or naval gunfire spotters and air controllers. The OV-10's armament allows it additionally to provide light suppressive fire for helicopter escort. The OV-10 is operated by VMO squadrons. (See fig. 8.)

2303. WEAPONS

a. General.--Marine aviation units are equipped with a variety of aircraft weapons and associated systems, and many of these weapons can be modified to suit the method of delivery and fusing necessary for each mission. In order to exploit fully the functional capacity of any weapon, it is essential to understand some basic nomenclature and what weapon options are available to the commander. Aviation weapons and systems include:

(1) General purpose and fire bombs.

(2) Rockets.

(3) Cluster bomb units (CBU's).

(4) Guns.

(5) Air-to-surface missiles.

(6) Air-to-air missiles.

(7) Flares.

(8) Special purpose weapons.

(NOTE: Only those weapons which reflect general capabilities are included. Complete weapons listings and descriptions and kill probability tables can be found in the FMFM 5-2 series, Joint Munitions Effectiveness Manuals (JMEM's).)

b. General Purpose, High Explosive Bombs.--The low-drag MK 80 series, general purpose bombs are the most frequently used by Marine aviation. (See figs. 9 and 10.) Specific weight classes and designations are as follows:

Designation	Weight Class
MK 81	250-pound
MK 82	500-pound
MK 83	1,000-pound
MK 84	2,000 pound

(1) Tail Assemblies.--The warheads of the MK 81, MK 82, and MK 83 may be configured with either of two types of tail assemblies--a

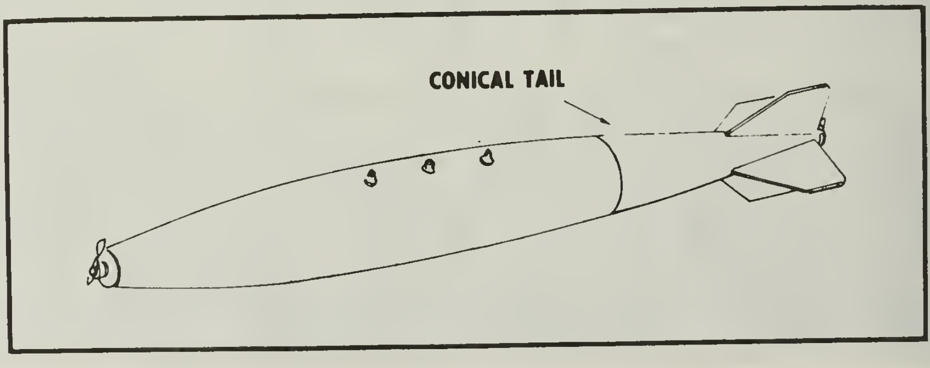


Figure 9.--General Purpose Bomb, Conical Tail.

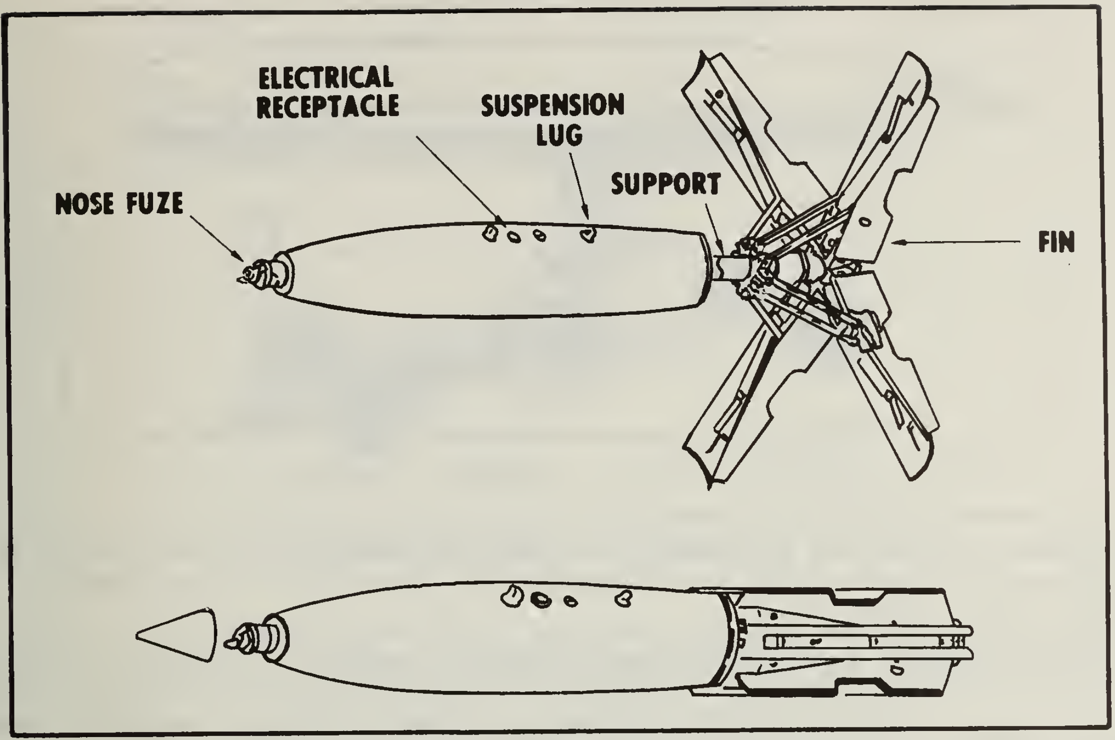


Figure 10.--General Purpose Bomb, Snakeye.

conical tail as shown in figure 9, or a retarding device as shown in figure 10. Bombs configured with the retarding tail device are called Snakeye bombs.

(2) Snakeye Bombs.--Snakeye bombs may be released in retarded mode (fin extended), or in a free-fall mode (fin retracted). The purpose of the retarded delivery is to allow bomb release from extremely low altitudes without endangering the delivering aircraft from ricochets, bomb fragments, or debris. The extended fins slow the bombs and allow the delivering aircraft time to separate from the projectile prior to its impact.

(3) Bomb Fusing.--Since weapon effectiveness is frequently determined by when and where the weapon detonates, proper fuze selection for the target to be attacked is critical. Fuze arming can be mechanical or electrical and can be positioned as nose, tail, or both. There are basically four types of bomb fuze detonations available:

(a) Proximity (airburst).

(b) Instantaneous (impact).

(c) Short delay (milliseconds).

(d) Long delay (hours).

c. Firebombs.--The MK 77 is the primary firebomb. (See fig. 11.) It has a fuel capacity of 75 gallons and weighs 520 pounds. Firebombs have a very erratic trajectory, and they must be released at very low altitudes

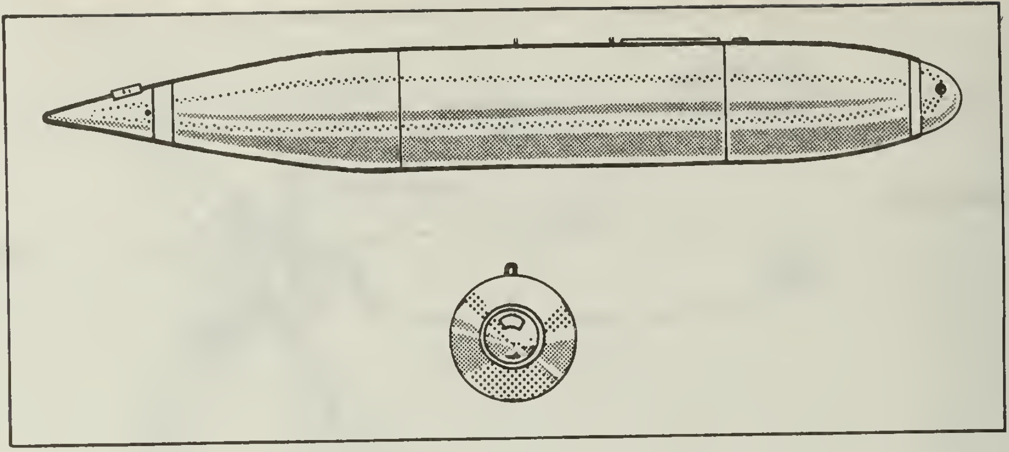


Figure 11.--MX 77 Firebomb (Napalm).

to achieve the desired accuracy. A typical ground pattern for the MK 77 is elliptical in shape and is approximately 215 feet long in the direction of delivery and 75 feet wide.

d. Cluster Bomb Unit Weapon Dispenser Systems

(1) The CBU weapon dispenser systems consist of several types of bomb casings filled with a large number of small weapons. There are a variety of different munitions including antipersonnel, antimaterial, and antitank. The CBU systems are designed to provide a high kill or damage probability against area, moving, and point targets. Although there are numerous dispenser-munition combinations, only the ones most frequently used will be discussed in this paragraph. For more technical information, see the FMFM 5-2 series, Joint Munitions Effectiveness Manuals.

(2) The Navy-developed MK 7 dispenser, loaded with MK 118 antitank bomblets, is designated as the MK 20 (Rockeye II) CBU weapon system. (See fig. 12.) The Rockeye is also compatible with carriage and delivery

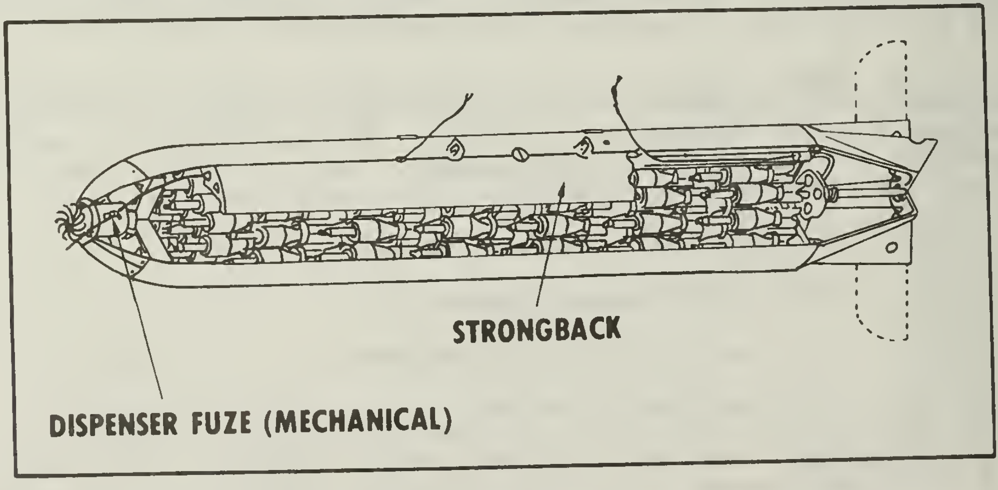


Figure 12.--Cluster Bomb Unit Weapon Dispenser, MK 20.

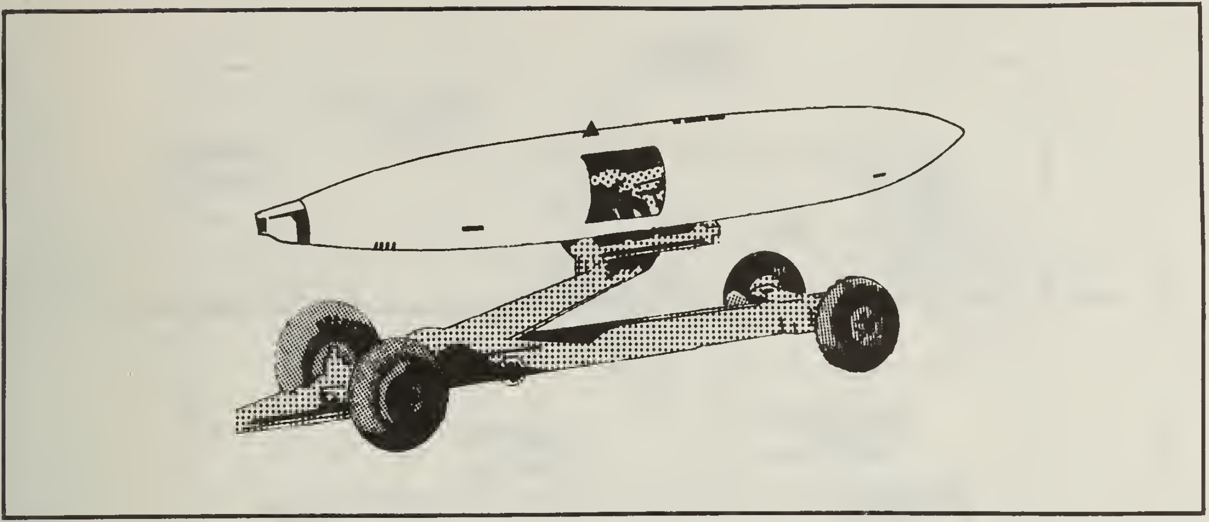


Figure 13.--MK 4, 20mm Gun Pod.

from MER/TER bomb racks and can be released from essentially all of the existing delivery maneuvers. In addition to being most effective against armor, the Rockeye has proven to be an excellent general purpose weapon.

e. Guns.--There are two basic gun configurations for the 20mm cannon--internal and external. The MK 4, 20mm gun pod is used in the external configuration. (See fig. 13.) It consists of two 20mm barrels; a rotating eight-chamber cylinder; and feed, firing, and ejector mechanisms. The pod has a 750-round capacity and a 4,800 ±200-round-per-minute rate of fire. The GPU-2/A, lightweight 20mm gun pod contains an M-197 gun, which has a 300-round capacity and low firing rate of 750-rounds per minute. (See fig. 14.) The GPU-2/A will be authorized to attack/helicopter MAG's. The 20mm gun is probably our most accurate and effective weapon against light and medium armored surface targets. Its greatest limitation is its lack of a standoff capability in heavily defended areas.

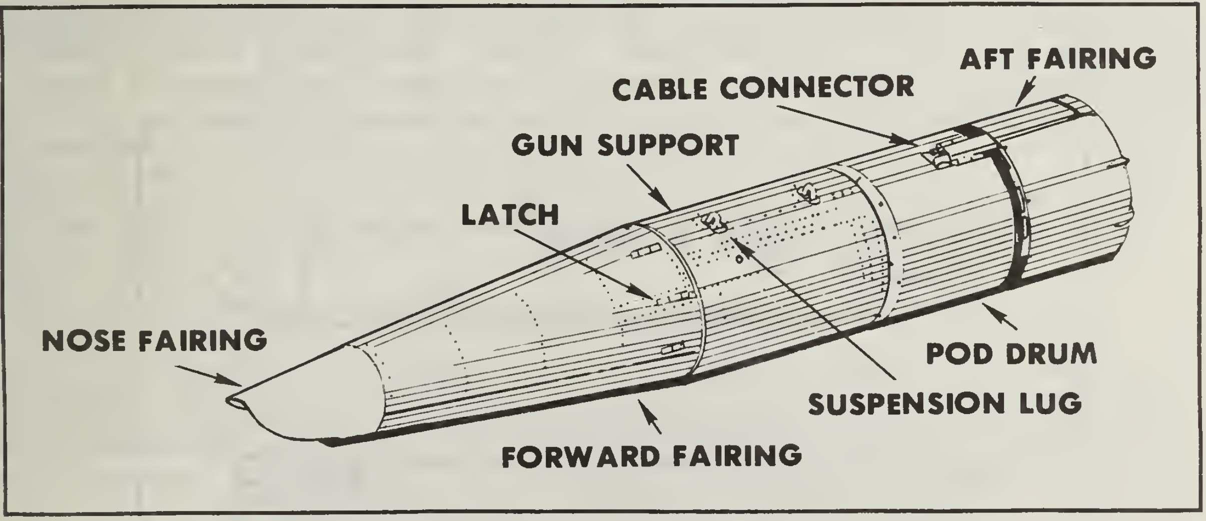


Figure 14.--GPU-2/A, Lightweight 20mm Gun Pod.

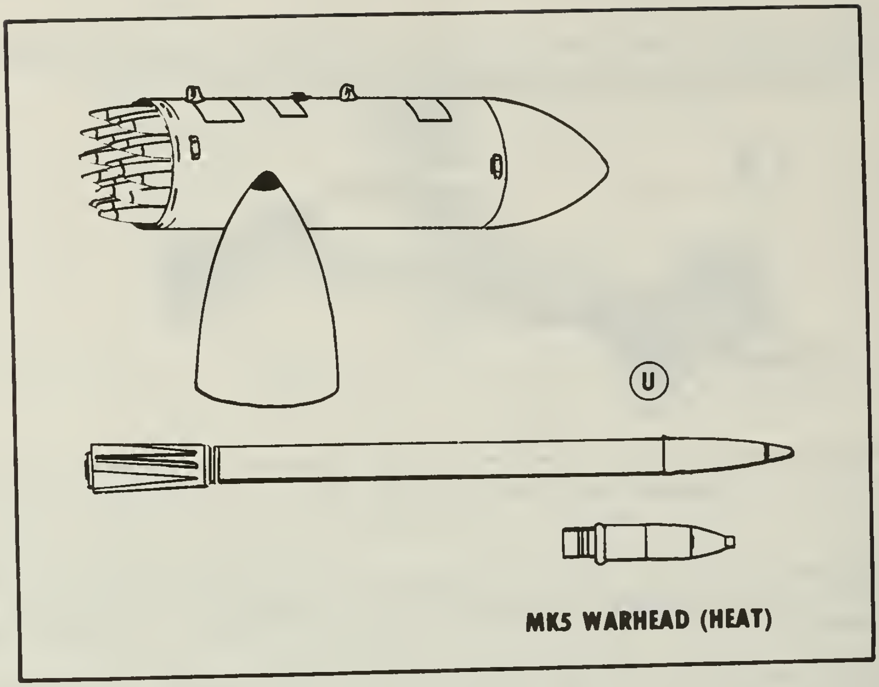


Figure 15.--2.75-Inch Folding Fin Aircraft Rocket.

f. Rockets.--Two types of air-to-surface rockets exist in the Marine Corps inventory--the 2.75-inch folding fin aircraft rocket (FFAR) and the 5-inch Zuni rocket.

(1) The 2.75-inch FFAR can be launched from two different pods; one pod carries 7 rockets and the other 19. (See fig. 15.) Presently, three types of warheads exist for this rocket--smoke for marking, fragmentation, and antitank or shaped charge. Rockets are usually fired in ripple (rapid repeat) in combat, since ripple firing greatly increases the probability of a hit.

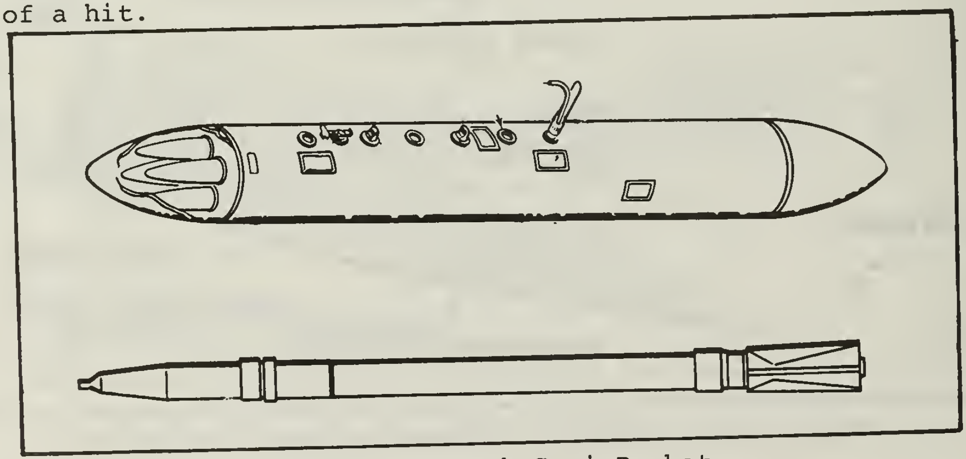


Figure 16.--5-Inch Zuni Rocket.

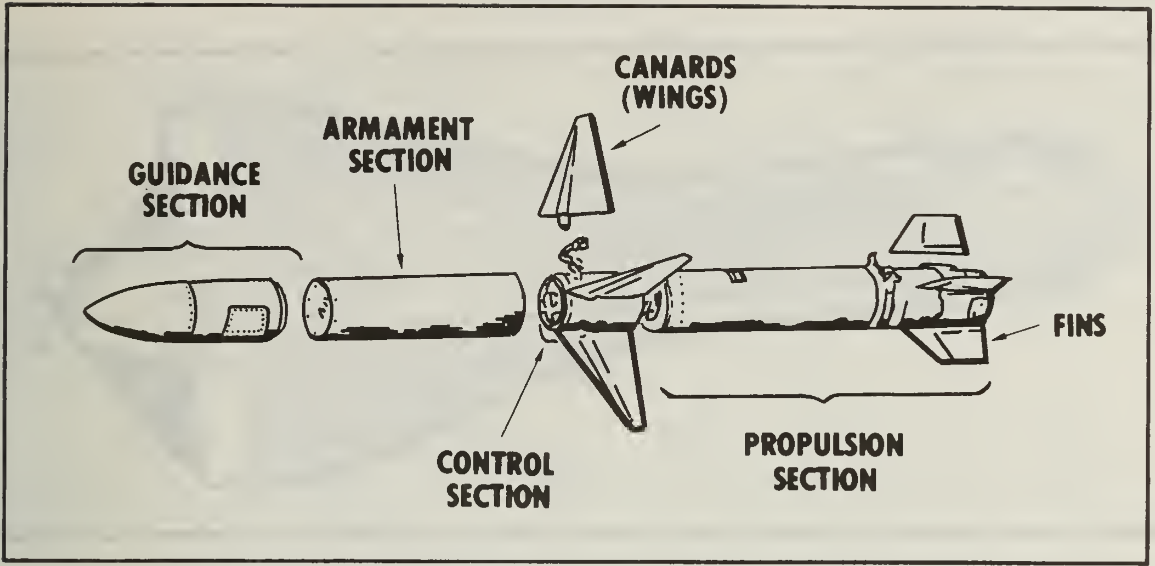


Figure 17.--Shrike Antiradar Missile.

(2) The 5-inch Zuni rocket is carried and launched from either a two-tube launcher or a four-tube rocket pod. (See fig. 16.) Rockets can be fired singly or in ripple; the warheads for the Zuni include fragmentation, antitank, shaped charge, and white phosphorous.

(3) The best ground fragmentation pattern is achieved by firing one pod or more on the same pass.

g. Air-to-Surface Guided Missiles.--The Bullpup, Shrike, and Walleye air-to-surface guided missiles have greatly increased our abilities in highly sophisticated defensive environments against hard or specialized targets. The design characteristics of these weapons provide increased accuracy, improved warhead effectiveness, and standoff capabilities.

(1) Shrike.--Shrike is a 400-pound, antiradar missile capable of detecting and homing on pulse-type radars. (See fig. 17.) Shrike's range is highly dependent upon the mode of delivery.

(2) Walleye.--Walleye is an air-to-ground glide bomb which has an automatic television-type guidance system. (See fig. 18.) The warhead is especially designed for use against heavily structured targets. In the close air support role, is is restricted to targets which are well defined, easy to acquire, and which contrast sufficiently with their surroundings for the homing of the weapon. It is also limited to daylight and clear weather conditions.

2304. CAPABILITIES OF AIRCRAFT WEAPONS SYSTEMS

The principal advantages of aircraft weapons accrue from their ability to hit targets which other supporting arms cannot engage because of range or defilade; to deliver munitions, including special weapons of great destructive power; and to destroy heavily fortified positions and point targets. Other significant aircraft capabilities include:

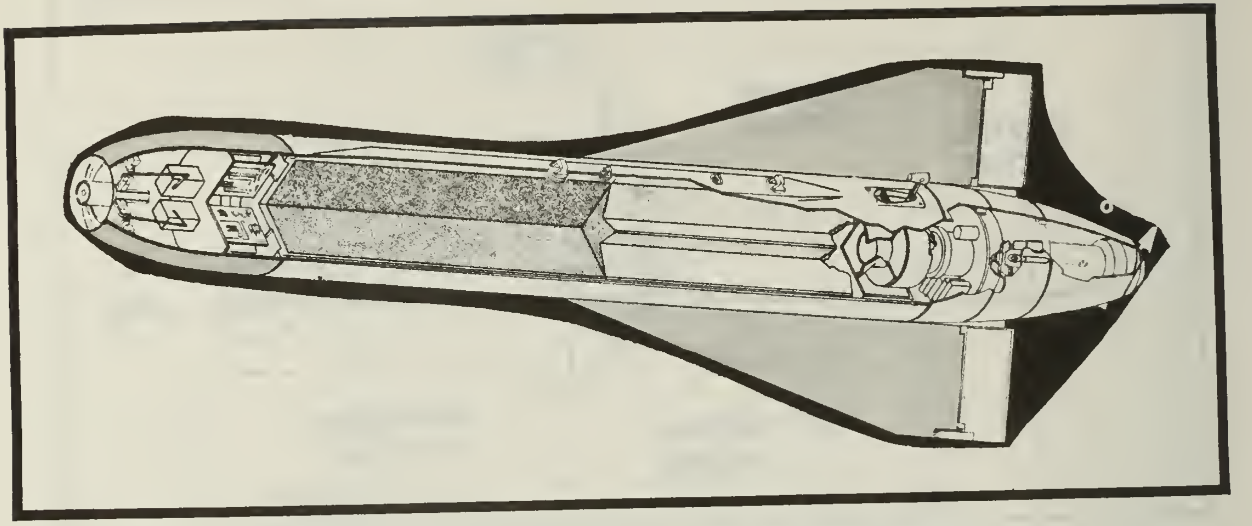


Figure 18.--Walleye Air-to-Ground Glide Bomb.

a. Variety of Attack.--Subject to weather, terrain, and troop safety limitations, aircraft have the ability to carry out the type of attack best suited to the target.

b. Accuracy.--The expected accuracy of air-to-surface weapons is dependent upon several factors, such as the degree of individual pilot proficiency and level of training, the visibility, and the pilot's ability to see the target or aim point. The expected accuracy is also affected by the type of delivery maneuver and the release height of the particular weapon. Normally, the delivery maneuvers used in a close air support situation would range from a level delivery to glide/dive angles up to 45 degrees. The release heights will vary from approximately 75 feet to 4,500 feet above the target elevation. Specific expected accuracies for the various weapons and delivery combinations can be found in the FMFM 5-2 series, Joint Munitions Effectiveness Manuals. Generally speaking, the normal order of expected accuracy for air delivered weapons is as follows:

(1) Strafing.

(2) Retarded Snakeye bombs and firebombs.

(3) Rockets.

(4) Free-fall (unretarded bombs).

c. Observation.--Aircraft performing close air support missions are capable of maintaining continuing observation over large areas, in addition to the area in which a close air support mission is being conducted. This capability enables aviation units to be of great assistance to the supported ground unit commander. Support aircraft can relay information of immediate value to the ground commander regarding enemy activity on reverse slopes and in other areas beyond or shielded from ground observation. The capability to search for and attack targets gives air support a significant advantage over other fire support means.

d. Speed and Maneuverability.--The speed of aircraft enables commanders to concentrate overwhelming air strength in the objective area from distant and dispersed bases and to deliver attacks with a great measure of surprise. Their speed and maneuverability also provide a measure of protection from enemy fires and detection from enemy radar.

e. Neutralization.--The ability of aircraft to operate in flights of more than one aircraft with great speed, and to carry large amounts and a variety of ordnance, enables them to neutralize targets that threaten landing force operations. Continued neutralization over a prolonged period is dependent upon the availability of aircraft; ordnance; petroleum, oil, and lubricants (POL); and integration with other supporting arms.

f. Radius of Action.--Tactical air support aircraft can operate from land bases or from aircraft carriers located a considerable distance from the target. The normal combat radius of support aircraft can be extended by in-flight refueling.

g. Mobility and Flexibility.--The mobility and flexibility of supporting air units permit the employment of a limited number of aircraft against individual targets or the concentration of large numbers of aircraft against targets of greater extent and more importance. The variety of armament which can be carried by each aircraft permits flexibility in selection of targets and makes every type of enemy installation a potential target. The control of close air support is highly flexible, since within the control system a close air support mission can be controlled by either ground agencies which include either a forward air controller or an air support radar team; or by airborne agencies, an airborne forward air controller or a naval aviation observer. Control can be shifted between these agencies as required to maximize effectiveness. The variety of delivery methods available from aircraft range from high angle; e.g., dive bombing, to low angle; e.g., glide bombing. The ability to integrate aircraft support with other supporting arms enhances their overall flexibility. The independence from terrain obstacles; e.g., rivers, hills, etc., and the aircraft's tremendous speed generally provide a mobility advantage to aircraft over surfaceborne supporting arms in the changing of areas or targets.

h. Availability.--Primary dependence is normally placed on tactical aviation in land operations beyond the range of naval gunfire and during periods when the artillery is displacing or is inferior to that of the enemy. During the assault phase of an amphibious operation and prior to landing the force's artillery, air and naval gunfire are the primary supporting arms available to the landing force. During the planning phase, aviation support is planned so as to provide the maximum number of aircraft possible in close support of the ground forces during the assault phase. Aircraft are maintained in an air alert status over designated points during the assault phase. This permits a part or all of an air unit to be directed against a critical target with minimum delay. V/STOL aircraft possess a forward based ground loiter capability that can match or better response times of air alert aircraft with significantly reduced draw-down of assets available. Ground alert aircraft enhance the overall capability of air to support landing force units; however, ground alert aircraft require a longer period of time to provide the support requested than aircraft in an air alert status.

i. Morale Effect.--Closely allied to all of the above is the positive effect air support has upon the morale of the supported troops. The airplane is an outstanding morale builder to friendly forces and, conversely, serves as a symbol of defeat to the enemy. The presence of aircraft engaged in close support missions has a detrimental effect on an enemy's morale, since it is a positive indication that the enemy has lost control of the air--that one arm of his forces has been overcome or defeated. Since the average enemy soldier cannot always determine the type of armament or aircraft, the aircraft alone can lower his morale and restrict his actions. When engaged in retrograde operations, maximum use of air support is essential to exploit the morale effect which it engenders in both the friendly and the enemy force.

2305. LIMITATIONS OF AIRCRAFT WEAPONS SYSTEMS

The most significant limitation of aircraft weapons systems is the difficulty in providing support at night and in periods of limited visibility. Other significant aircraft limitations include:

a. Radius of Action.--The radius of action of an aircraft is determined primarily by the fuel on board in relation to the amount of armament carried. As the ordnance load is increased, beyond a certain point there must be a compensatory reduction in the fuel that can be carried. This, in turn, reduced the distance that the aircraft can travel to and from the target.

b. Time on Station.--Time on station is also influenced by the factors set forth above. Other factors are distance from the air base to the forward edge of the battle area (FEBA), fuel consumption in relation to altitude flown, and fuel reserve requirements. Jet aircraft are least efficient in endurance when operating at low altitudes. Air alert aircraft, therefore, normally orbit at higher altitudes while awaiting a strike mission. Forward based V/STOL aircraft are capable of extended time on station while awaiting a strike mission when utilizing a ground loiter capability. Even though the V/STOL aircraft is not actually airborne, his effective "time on station" is increased. In a high threat missile environment, aircraft can be expected to remain in the target area no longer than 3-5 minutes.

c. Communications.--Radio communications are of great importance to air support strikes. Radio communications are the only means for transmitting detailed instructions to airborne aircraft. Coordination of aircraft support missions with airspace coordination areas (ACA's) and suppression of enemy air defenses (SEAD) requires positive control and reliable radio communications. Due to sophisticated enemy communications jamming systems/devices, lengthy conversations between aircraft and controlling agencies may be precluded. Mission briefs, coordination, etc. will, by necessity, be accomplished prior to launch. Target acquisition and identification will normally be accomplished by dead reckoning navigation and prebriefed markings.

d. Identification of Targets.--Identification and location of prebriefed targets are done visually, usually by reference to grid maps or aerial photographs, and by good target descriptions. The controller must communicate the description and location of the target to the pilot by radio. Target-marking devices are utilized where practicable and desirable. Training, improvements in target grid photos, and improved electronic equipment offer effective means for making target identification more rapidly and positively. Navigation aids may be used to bring aircraft into a target area. Further identification may be done in relation to prominent terrain features and the use of smoke.

e. Weather.--Weather, in addition to being a limiting factor itself, aggravates all other limitations. The weather at the target is the main limitation, rather than en route and home base weather. Weather at the target area makes location of the target difficult and limits the types of attack which can be made. With low ceiling and poor visibility, the effectiveness of visual close support decreases. As ceiling and visibility improve, so does the capability for close air support. Rapid progress is being made in the technology of close air support attack, as well as the identification of targets and launching of missiles against targets under all conditions of weather and darkness.

f. Enemy Antiaircraft Efforts.--The proliferation of man-packed and vehicle-mounted antiaircraft artillery and missile systems provides an opportunity to mass antiair fires with frontline units. Concentrations of fire by in-flight tracking weapons systems may force offensive air support aircraft into a defensive role and preclude the effective employment of weapons in support of ground troops.

2306. GROUND SUPPORT

An extensive support effort is required to keep aircraft flying. Since an aircraft is not performing its mission while awaiting servicing on the ground, minimum time should be spent on refueling, rearming, and general maintenance. In consonance with this overall effort, a vast array of equipment is required in the ground support role to expedite the necessities of making aircraft launch-ready.

a. Aircraft Ground Support

(1) Vehicles.--All sorts, sizes, and shapes are needed to start, tow, service, and recover aircraft. Types of vehicles range from a small battery cart to a gigantic crane. Examples of ground support vehicles are contained in the following list, but they are too numerous to cover in detail in this publication:

(a) Tow tractors; for towing and positioning aircraft.

(b) Starting units; to provide the electrical power and compressed air necessary for starting or performing maintenance functions.

(c) Oxygen/nitrogen carts; to service and replenish oxygen/nitrogen systems.

(d) Fuel trucks; for refueling if a tactical airfield fuel dispensing system (TAFDS) is not operating.

(e) Defueling trucks; for defueling as a safety measure prior to maintenance work or to withdraw contaminated fuel.

(f) Crash vehicles; to provide fire fighting and rescue equipment, and the personnel specifically trained to minimize injury and damage resulting from an aircraft mishap.

(g) Cranes; for lifting disabled aircraft and aircraft parts (e.g., engines, transmissions, or portions of a fuselage).

(2) Maintenance Equipment.--Ground support equipment not categorized as vehicles, but specifically designed for aircraft maintenance includes:

(a) Work platforms; can be raised or lowered tc reach the area on the aircraft upon which maintenance must be performed. They provide a steady, level platform on which to work.

(b) Portable jacks; necessary to change tires or the landing gear.

(c) Engine stands; especially designed for ease in changing engines and to perform maintenance on the engine while it is out of the aircraft.

(d) Hydraulic jenny; portable hydraulic unit used for servicing the hydraulic system of an aircraft. It provides hydraulic pressure to the aircraft systems without turning up the aircraft engine; thus, hydraulic systems can be checked.

(3) Ordnance Support Equipment and Spaces

(a) Weapons loader; to ease the loading of ordnance aboard aircraft.

(b) Weapons carrier; carries ordnance from buildup area to aircraft.

(c) Buildup area; a designated area for the assembly of ordnance. It is normally located away from the aircraft and personnel.

(4) Avionics Ground Support

(a) Air conditioned mobile maintenance facilities (MMF's) provide controlled environment for maintenance of the sensitive avionics systems.

(b) Test equipment; usually maintained in the air conditioned trailers to test and repair avionics components.

b. Radar Ground Support.--A radar facility will usually be dispersed over a wide area, thereby necessitating a fairly large amount of space and equipment for its operation.

(1) Air Conditioned Soundproof Trailer.--Radar equipment generates a large amount of heat. To prolong the life of the equipment, air conditioning is necessary. Also, the critical radio communications between the controllers and aircraft require protection from environmental noise.

(2) Radar Units.--Radar units are usually large and consideration must be given to their location and the space required to accommodate them.

(3) Portable Equipment

(a) Radar beacon forward air controller radar beacon for air control used by a forward air controller to guide aircraft to a target during inclement weather.

(b) ASRT equipment; trailers, antennae, and vehicles to support an ASRT.

(4) Computers for TACC/TAOC.--These must be in an air conditioned space to prolong the life of the computers. They are used to disseminate information vital to the aircraft.

2307. AUTOMATED DATA SYSTEMS (ADS)

A basic understanding of computer systems is essential for commanders. Automated data systems provide timely, mission-essential information and may have a decisive influence on the outcome of future combat operations.

a. Responsibility of the Commander.--Most computers have five predominant characteristics. They are digital, electronic, high-speed devices providing automatic retrieval of information utilizing a stored program. A computer functions only in response to the way in which it has been programmed and is, therefore, only as accurate and efficient as the people who program and operate it. Any computer must be provided current and accurate data. It is the responsibility of the military commander to determine what information is to be analyzed, what the relative weights of the variables are, and in what format the resultant analysis is to be presented. The computer assists the commander in decision making by providing a source of accurate and responsive information, but to take advantage of this capability, he must ensure efficient operation at both ends of the system. Once again, to get sound and useful information from a computer, the information input must be accurate and the program selected applicable.

b. Types of Systems.--The Marine Corps uses three types of automated data systems. These systems may share computers and information as warranted. They are:

(1) Functional Systems.--Functional systems are those designed primarily to aid in the execution of administrative command and control of resources. In the processes of planning, acquiring, and distributing resources, historical information is developed on which decisions can be based.

(2) Tactical Systems.--Tactical systems are those systems designed to assist in the command and control of forces in a combat environment.

(a) TACC.--Within the TACC, the requirement exists to display selected information. This need is generated by the responsibility of the TACC to direct and supervise MAGTF air activity. The TACC is equipped with manual status boards for these displays which include information concerning equipment, communication status, weather reports, and other pertinent information. The tactical air communication central, AN/TYQ-1, and tactical data communication central, AN/TYQ-3, developed to replace the manual system under the Marine tactical data system (MTDS) program, provide the TACC with the automatic data processing display and communication equipment to effectively manage all air operations with a minimum delay in decision making.

(b) TAOC.--Component elements of the TAOC require different displays which correspond to the different tasks performed. Of major concern are the displays available to the weapons controller and the senior weapons director. These men are responsible for evaluations and commitments of weapons, and must rapidly be made aware of needs. The weapons controller has available a display of a subsector of his responsibility. Symbology on the display provides the identification designations of the various aircraft operating within and adjacent to the subsector. Symbology also represents the weapons aboard the aircraft and their readiness status to the controller.

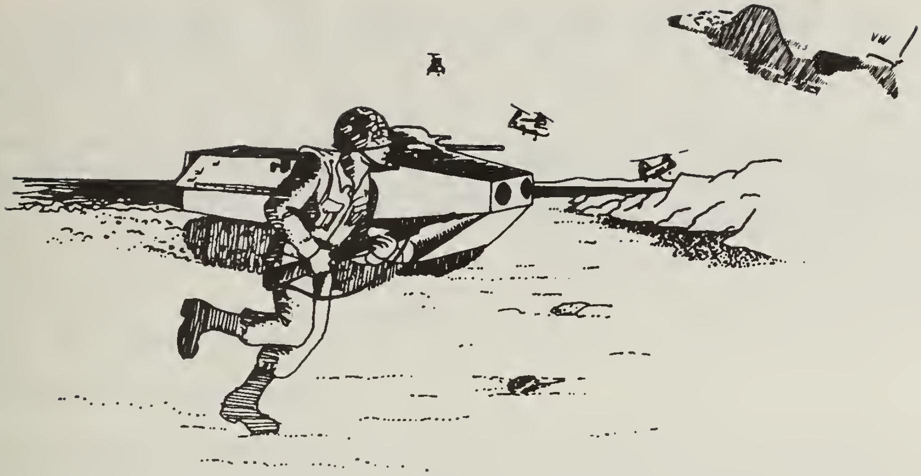
(3) Information Systems.--An information system is designed and used primarily for the purpose of assisting the Commandant of the Marine Corps and subordinate commanders in the acquisition and management of resources. It draws from functional and tactical systems, as needed, to provide information for inquiring commands.

c. Amphibious Support Information System (ASIS).--ASIS stores information on personnel, intelligence, landing serials, air schedules, aircraft ordnance, target lists, supply management, material management, and ammunition status. It also performs tasks such as communication scrambling. As a system of such flexibility, it is of important use to the commander. The ASIS is located on LCC class vessels.

d. Ground Supply and Maintenance Automated Data Systems.--The ground supply and maintenance automated data systems are the Supported Activities Supply System (SASSY) and the Marine Corps Integrated Maintenance Management Systems (MIMMS). These systems provide information required to manage these two logistics functions for Marine Corps peculiar items of equipment.

e. Future Systems.--Future systems of importance to the aviation commander are being developed and/or tested to provide an automated air command and control system and a position-location reporting system. These systems will provide closer coordination with ground elements which will be particularly useful in fire support coordination.

f. Synopsis.--This paragraph does not mention all the systems. It does point up the fact that they all are limited by the availability of the user to provide input to the system. Moreover, the commander must understand what the computers are doing for him and what he must do to ensure that his command continues to function when and if the computer fails.



CHAPTER 3

AMPHIBIOUS OPERATIONS

Section I. INTRODUCTION

3101. GENERAL

The amphibious operation integrates ships, aircraft, weapons, and landing forces in a concerted military effort against a hostile shore. The amphibious assault builds up combat power ashore from an initial zero capability to a fully coordinated striking power in the face of the difficulties of seas, surf, and hydrographic features, in addition to the problems normally encountered in land warfare. Close cooperation and detailed coordination among all participating forces in an amphibious operation are essential to success. There must be a clear understanding of the mutual obligations and of the special capabilities and problems of each component. Because the assault elements are closely tied to the ground combat element, their logistic needs, the shipboard operations, and the air control system, a mutual exchange and understanding must exist. This chapter provides an insight into the capabilities and problems of the offensive air support forces in the amphibious operation.

a. Navy Forces.--The Navy element of the amphibious task force (ATF) may include one or more of the following: transport group, control groups, tactical air control groups, fire support group, shore-based Navy tactical air group, support carrier group, screening group, mine warfare group, reconnaissance and underwater demolition group, tactical deception group, inshore undersea warfare group, close covering group, patrol plane group, air transport group, and an administrative group. The function of these units is discussed in LFM 01, Doctrine for Amphibious Operations.

b. Landing Force.--The landing force comprises the troop units, aviation and ground, assigned to conduct the amphibious assault.

c. Air Force Forces.--When Air Force forces are assigned to the amphibious task force, they will be organized as a separate force or component under the command of an Air Force officer. When the preponderance of tactical aviation is provided by the Air Force for the amphibious operation, the Air Force officer will be designated to direct the total air effort. When the preponderance of tactical aviation comes from the Navy or Marine Corps, the overall air effort will be directed by a naval aviator. In either case, the officer so designated will be responsible for the preparation of the amphibious task force air plan.

Section II. EMPLOYMENT OF OFFENSIVE AIR SUPPORT

3201. GENERAL

Offensive air support is employed primarily to provide fire support for the landing force. This fire support may be close in or beyond the FSCL, immediate or preplanned, and neutralizing or destructive in nature. The amount of offensive air support will be determined by the size and scope of the operation, the capabilities of the enemy, and the commander's concept of operation. It must be closely coordinated with other supporting arms such as artillery and naval gunfire, and as closely as possible, meet the needs of the ground commander.

3202. PRINCIPAL CONSIDERATIONS

The principal consideration in the employment of offensive air support aircraft is the concept of operations. Although the commander must be concerned with a myriad of items during the planning phase, some of his more significant considerations are as follows:

a. Aircraft Availability.--The numbers, models, and capabilities of the aircraft assigned.

b. Air Superiority.--Air superiority is necessary to provide security for strike aircraft. The attainment of air superiority may permit the use of some dual purpose (VMFA) aircraft in a close air support or deep air support role which would otherwise be required to provide air-to-air protection for strike aircraft.

c. Location of Aircraft.--If strike aircraft are a considerable distance from the target area, the ordnance load must be decreased to allow more fuel to be carried; also, less time on target will be available.

d. Forecast Weather.--Favorable weather conditions are generally necessary for effective close air support as the types of attacks are influenced by ceiling and visibility. All-weather aircraft, such as the A-6, the ground based radar course directing system, and the RABFAC allow bombing in marginal weather, ensuring limited CAS. Nevertheless, the level and distribution of CAS normally encountered with a MAGTF is significantly restricted by unfavorable weather. Deep air support is less restricted by weather because of the sophisticated systems of the A-6 aircraft, the radar directed bombing through the ASRT's and the absence of friendly troops. However, visual attack aircraft, such as the A-4 and AV-8, can be used more effectively in good weather conditions.

e. Enemy Surface-to-Air Capabilities.--Today's airmen can expect both surface-to-air missiles and a wide range of conventional antiaircraft fire from the enemy. SEAD, evasive tactics, and electronic countermeasures (ECM) must be carefully coordinated when planning air strikes.

f. Air-Sea Rescue.--Coordination for rescue in the event of a downed aircraft or aircrew is a principal consideration. Rescue combat air patrols (RESCAPS) and helicopters should be made available for this purpose.

g. Aircrew Proficiency.--The commander must consider the capabilities of his aircrews. Sufficient numbers of aircrews to allow proper rest and their level of experience are both significant for complex and/or prolonged operations.

h. Types of Ordnance Available.--The many types of weapons available to the Marine Corps today can provide a great degree of flexibility for the commander. Sophisticated weapons, such as the laser and TV guided bombs, allow greater standoff distance and greater accuracy. CBU's allow coverage of area targets and provide a higher probability of success when engaging point targets.

i. Communications.--Positive and reliable communications between aircraft and controlling agencies is essential for safe and efficient conduct of the mission.

j. Response.--Effective air support is responsive to the needs of the ground commander.

3203. CONCEPT OF OPERATIONS

The overriding factor for the employment of offensive air support is the concept of operations. The plan for landing the assault troops, the scheme of maneuver ashore, the landing force objectives, and the amphibious task force mission will dictate the degree of offensive air support required. Once these have been determined, the TAC will formulate his own plan of how the strike aircraft will be employed. The TAC's concept of operations will include operations prior to, during, and after the amphibious landing. It should also include anticipated requirements for air if the landing force remains ashore after the amphibious assault is terminated.

3204. METHODS OF EMPLOYMENT

The methods of employing offensive air support aircraft are determined by the considerations listed in paragraph 3202. In essence, it depends upon what is available, where the assets are located, what the requirements are, and the capabilities of the enemy.

a. Visual Bombing.--Both close and deep air support are most frequently accomplished by visually locating the target and delivering ordnance under the terminal control of an AFAC or FAC during CAS and under the control of the flight leader during deep air support. These missions are usually preplanned and the ordnance is predetermined for the type of target assigned; e.g., general purpose bombs for enemy facilities, rockets or cannons for enemy troops, and delayed fusing for bunkers.

b. All-Weather Bombing.--Sophisticated systems in aircraft and related equipment have created significant flexibility in offensive air support. Radar and computers, both airborne and on the ground, allow ordnance delivery on targets protected from visual attack aircraft because of bad weather or darkness. Visual attack aircraft, such as the A-4, can be employed at night if illumination is provided, or in conjunction with the ASRT when weather restricts visibility.

c. Early Phasing Ashore.--If offensive air support aircraft are phased ashore early, the response time for on-call missions is significantly decreased.

d. Ground and Airborne Alerts.--Most offensive air support missions are preplanned. Targets are assigned as they are located through intelligence sources and reconnaissance flights. As the operation progresses, however, targets are identified that pose an immediate threat to ground troops, facilities, or aircraft and must be neutralized or destroyed as quickly as possible. Aircraft are placed on ground and/or airborne alert to accommodate these on-call missions. The air alert requires a significant number of aircraft to maintain a minimum of one section (two aircraft) on station. Also, air refueling may be required if the airborne alert station is a long distance from the operating base and/or an extended time on station is desired.

e. A detailed discussion on the employment of attack aircraft is found in section V of this chapter.

3205. FUNCTIONAL INTEGRATION

a. General.--Efficient coordination of the diverse elements of the aviation element of a MAGTF requires a complex, yet flexible, control system --the MACCS. Each MACCS agency, in addition to performing its primary function, may also participate in functions that are the main responsibility of another agency. For example, the DASC controls air operations directly supporting friendly ground forces; yet, the DASC also plays a role in air defense by disseminating air defense alert conditions to ground forces. Conversely, the TAOC, primarily an air defense agency, plays a major supporting role in close air support operations by providing en route flight following for attack aircraft. By adjusting to a changing combat environment, the MACCS provides the required services that the tactical situation dictates.

b. Definitions and Agency Relationships.--To describe the control of aircraft and missiles, some basic definitions and an understanding of air control agency relationships is needed. All organizations which include aviation elements exercise the function of control to some degree. The type of control exercised by designated air control agencies (e.g., command, air direction, air control, and terminal control) help identify the tasks of specific agencies. (See fig. 19.)

	TACC	TADC	TAOC	DASC	ASRT	TACP	TAC (A)	HC (A)	FAC (A)	FAC	LZCT	FLT LDR
COMMAND	X											
AIR DIRECTION		X	X	X		X	X	X				
AIR CONTROL			X	X	X	X	X		X	X	X	X
TERMINAL CONTROL					X	X	X		X	X	X	X

Figure 19.--Types of Control and Associated Agencies.

(1) Definitions

(a) Command.--"The authority which a commander in the military service lawfully exercises over his subordinates by virtue of rank or assignment. Command includes the authority and responsibility for effectively using available resources and for employment planning, organizing, directing, coordinating, and controlling military forces for the accomplishment of assigned missions...."

(b) Control.--"Authority which may be less than full command exercised by a commander over part of the activities of subordinate or other organizations."

(c) Air Direction.--The supervisory activity exercised by an agency over aircraft and missiles to regulate and determine the specific employment necessary to maintain a balance between available air resources and user demands; also, to determine in conjunction with the user, the priorities assigned for their usage.

(d) Air Control.--The act of directing the maneuver of aircraft by personnel using radio, radar, or other means external to an aircraft.

(e) Air Controller.--"An individual especially trained for and assigned the duty of the control (by use of radio, radar, or other means) of such aircraft as may be allotted to him for operation within his area."

(f) Air Control Agency.--An organization possessing the capability for the control and direction of aircraft while maintaining a corresponding capability to coordinate such control and direction with other agencies, both air and ground.

(g) Airspace Control

1 Airspace control consists of the coordination, integration, and regulation of all aircraft within an airspace of defined proportions. In this context:

a Coordination is considered as that degree of authority necessary to achieve effective and flexible use of airspace involving less than command authority over each aircraft operating in that airspace.

b Integration refers to the necessity to consolidate requirements for the use of this airspace in the interest of achieving its most effective use.

c Regulations indicate the requirement to supervise activities in this airspace through the use of standardized procedures to ensure coherent use of that airspace.

2 Airspace control's primary purpose is to provide a service that ensures maximum flexibility of action and efficient use of air assets. It is not intended to delay or confuse air operations.

(h) Terminal (Air) Controller.--An air controller located near the scene of activity to assist assigned aircraft in accomplishing a specific mission.

(2) Agency Relationships.--The relationships that exist between the various agencies can be best defined in the context of the type of control each agency exercises. For this discussion, the various types of control are defined as:

(a) Command.--The one MACCS agency which exercises command is the TACC. In this role, the TACC acts as the command post of the TAC, who is the designated aviation representative of the MAGTF commander.

(b) Air Direction.--Air direction is the most common form of control exercised by the major MACCS control agencies. The process of regulation, determination of employment, and maintaining balance between assets and priorities is complex. Air direction starts with the preparation of the daily fragmentary (frag) order by the senior air element's headquarters (e.g., in an MAF operation, it will be the aircraft wing headquarters). Subsequent air direction tasks include, but are not limited to, aircraft status checks for pending missions, reassignment of airborne assets to higher priority missions, processing of air support requests, collection of information concerning mission status, aircrew briefings, and the exchange of other pertinent information among appropriate control agencies. Air direction, therefore, is the management of a finite number of aircraft and control agency assets for the accomplishment of the aviation mission. Inefficient air direction results in poor aircraft utilization and excessive response times. Air direction requires a large volume of information and a pervasive communication network. Air direction also includes the authority to adjust mission assignments within previously designated parameters due to changes in the air or ground situation. The TACC, TADC, TAOC, DASC, TAC(A), and HC(A) are the MACCS agencies which perform air direction.

(c) Air Control.--Air control is performed when an air controller actually maneuvers an aircraft by directing the pilot. In contrast to air direction, air control does not require the same quantity of information from multiple sources. In most instances, the information is predominantly single mission related and the communications are between the aircrew and the air controller. Tasks dealing with the actual maneuver of aircraft are air control tasks. The TAOC, ASRT, TACP, FAC, LZCT, AFAC, and the flight leader perform the air control function.

(d) Terminal Control.--Air control and air direction involve activity by major MACCS agencies. This activity, however, ceases upon assumption of control by a terminal controller. The significant details of terminal control are prescribed according to the type of mission. Terminal control is actually a subset of air control and applies to those MACCS agencies which control the delivery of ordnance, cargo, or personnel by aircraft to a specific geographic location or air target. The distinction between air control and terminal control is significant for purposes of classification and definition. The training is specialized and differs from that performed by other air controllers. Even though they are part of the MACCS, some terminal control agencies are not organic to the aviation element (e.g., TACP). However, they are fully integrated into the system through communications, doctrine, and MAGTF procedures. The terminal controller's task is to control the weapons system during the actual delivery.

Actual delivery is usually the task of the weapons system commander. There are exceptions to this general rule; e.g., ASRT. Under normal circumstances, terminal control is considered separate from weapons system operation. The control of a helicopter touching down in a landing zone is an example of terminal control.

Section III. PREPARATION

3301. GENERAL

Tactical air operations in support of an amphibious operation are primarily directed towards gaining and maintaining air superiority, destroying and/or neutralizing enemy ground capabilities in the objective area, and responding to particular and immediate needs of the assault elements of the landing force. This and subsequent sections discuss the general sequence of execution of the amphibious operation and the aviation tasks which are to be performed in support of this type of operation. Training, rehearsals, and security will be reviewed.

3302. TRAINING

Training for tactical air operations in support of the amphibious assault is an extension of the regular training programs of all concerned elements. Special emphasis is placed on those phases of training most pertinent to the projected operation, and the effort is concentrated on specific problems anticipated in the operation. All units must become thoroughly familiar with air support techniques and control procedures. Communication equipment is tested as control units, air units, and ground units train together to become thoroughly familiar with their individual capabilities and limitations. Command post exercises (CPX's) for all command and control echelons of the air-ground task force are conducted when possible. Training stresses any special environmental conditions that may exist in the objective area; i.e., extremes in weather and/or terrain.

3303. REHEARSALS

Landing force aviation units participate in rehearsals to perfect communications required for command and control and to familiarize themselves with all aspects of the amphibious plans. The site of the rehearsal is selected to provide for radio communication checks within the bounds of security. An area with a land mass similar to the objective area is desirable to provide a further evaluation of the predicted radio and radar coverage. The decision as to the number and types of rehearsals is governed by the assigned tasks of the different forces, the time available, and the degree of coordination required.

3304. OPERATIONS SECURITY

a. The similarity between the rehearsal and the actual operation necessitates that strict security measures be enforced during rehearsals. The selection of and arrangements for the use of the areas in which rehearsals are to be held must be discretely conducted. Deceptive measures may be necessary to ensure the security of the rehearsal.

b. Observation by unauthorized personnel or unauthorized communications by personnel of the amphibious task force with external agencies must be prevented. The isolation of personnel and ships and the establishment of security perimeter patrols around the rehearsal area, both at sea and ashore, are the primary means of achieving security. Special precautions must also be taken to achieve secure communications.

c. Within the amphibious task force, special security and counterintelligence measures may include such measures as these:

(1) Establishment of secure planning area.

(2) Use of code names and symbols.

(3) Special classification of material used in planning.

(4) Restrictions on dissemination of intelligence, information, and completed plans.

(5) Communication and electronic security.

(6) Cover and deception plans.

(7) Measures for handling civilians.

(8) Armed forces censorship.

(9) Control of accredited correspondents to include field press censorship.

(10) Measures to counter subversion, espionage, and sabotage directed against the amphibious task force.

(11) Security of classified documents and material.

Section IV. EXECUTION

3401. GENERAL

Offensive air support, executed during an amphibious operation, is categorized in terms of pre-D-day, D-day, and post-D-day operations. If landing force aviation remains in the area after the amphibious assault has been terminated, there will be a fourth category--postassault phase operations. Each category has tasks that are geared, but not limited to, that specific phase of the amphibious operation.

a. Target Classification and Priority.--Information on targets must be adequate to determine the relative importance of a target and the volume and type of fires required for the desired effect. Target analysis commences with the receipt of initial information on the enemy and the area of operations and is incorporated into an appropriate target list. Collection and analysis continues throughout the operation with continual updating of the target list. The target list is compiled according to the following classifications and priorities:

(1) Target Classifications.--Target classifications include:

(a) Class A.--Targets which jeopardize the amphibious task force through their threat to shipping, aircraft, minesweeping, and underwater demolitions operations.

(b) Class B.--Targets which affect the ATF by threatening the landing force in the ship-to-shore movement and/or the beach assault.

(c) Class C.--Targets which affect landing force operations ashore and facilitate continued enemy resistance.

(d) Class D.--Targets not to be attacked prior to D-day.

(e) Class E.--Targets restricted by the CATF which will not be destroyed, except upon direct order.

(2) Target Priorities.--Within each target classification, the following priorities are assigned:

(a) Priority I.--Targets capable of preventing the execution of the plan of action.

(b) Priority II.--Targets capable of immediate serious interference with the plan of action.

(c) Priority III.--Targets capable of ultimate serious interference with the execution of the plan of action.

(d) Priority IV.--Targets capable of limited interference with the execution of the plan of action.

b. Target Information.--Requests for target information originate from many sources: from the supporting force or from the forces being supported. When an air support request is received by the aviation component, the operations section will request that the intelligence section evaluate and compile the available data on the selected target. The air combat intelligence branch of the intelligence section, in conjunction with the photo-imagery interpretation branch, will compile and evaluate all information on the target. Target files and target dossiers will be consulted for each target. The intelligence section then prepares and transmits a concise package of all pertinent intelligence on the target to the tactical aircraft groups upon approval of the mission. The specific target information consists of the following:

(1) Imagery of the target.

(2) Flak analysis of the target air defenses showing recommended routes in and out.

(3) Special target information, including any annotations intended to aid in target identification.

(4) Enemy electronic order of battle (EOB).

(5) Enemy air order of battle.

c. Target Analysis.--The senior aviation intelligence section will analyze target vulnerability and worth based upon aircraft reconnaissance, target files, flak charts, and reports. This is accomplished by the intelligence section from interpretation of photographs taken by the aviation component's reconnaissance aircraft or acquired from higher commands, or from intelligence taken from target files and/or dossiers. The intelligence section will analyze flak charts and reports. This enables the intelligence section to keep the operations section abreast of the best possible approach and retirement lanes into particular targets. The information is passed on to the operations section, who performs the following functions relative to the tactical operations:

(1) Selects the target.

(2) Selects the ordnance.

(3) Determines the number of sorties required based upon the probabilities and damage level desired.

d. Target Selection.--Targets are selected by the operations section after the analysis has been completed by the intelligence section. The operations section then prepares a complete package; i.e., target, force requirements, ordnance selection to be used, tactics to be employed, for presentation to the landing force aviation commander. For preparation of target lists, see FMFM 2-1, Intelligence.

(1) The operations section determines when and what forces will be available for the strike. This information is arrived at by using an aircraft utilization worksheet. This completed form then becomes the basis for the warning order and the frag order which are issued daily to the subordinate units for the following day's operations.

(2) The operations section will plan the organization of the strike units, rendezvous points, and approach routes to the targets. The operations section will not direct the type of formations to be used on the

mission, but they will exercise certain coordination to ensure that the targets are hit at the proper time, that the different subordinate units understand who is leading the strike, and that all units of a particular type are employing similar tactics.

e. Ordnance Selection.--The type, size, and delivery method of ordnance is selected upon consideration of the nature of the target area, weather, and the desired degree of damage. Publications have been prepared to assist the planner in determining the ordnance load, type aircraft, aircraft configuration, and the number of sorties required for a specific level of damage against a selected type of target (see fig. 20.) In addition, when selecting aircraft ordnance, the following factors are considered:

(1) The vulnerability of a target to attack.

(2) The desired method of delivery. The method of delivery is usually arrived at by comparing the optimum delivery techniques against the effects of active enemy air defense upon aircraft survivability. This comparison analyzes the following:

(a) Standoff Requirement.--Enemy weapons in the target area which jeopardize delivery aircraft safety.

(b) Weather.--Target area weather affects the accuracy of delivery. Further, it affects the control and number of aircraft which may be utilized due to cloud cover and restricted visibility.

(c) Ordnance.--Availability of ordnance by type will dictate its usage.

(d) Aircraft.--The number and type of aircraft available will influence the delivery method and the ordnance selected.

(3) The types of aviation ordnance are compared with the accuracy and circular error probable (CEP) of the delivery squadron in order to determine the degree of damage that can be expected against a target. The FMFM 5-2 series, Joint Munitions Effectiveness Manuals, list all conventional weapons and the damage effect that can be expected against a variety of targets. This can be translated to sorties required to achieve the desired damage level.

f. Briefing and Debriefing.--Prior to embarking on tactical air missions, combat pilots and crews are briefed by the intelligence and operations officers. Such briefings are conducted to ensure that they have the information needed to execute their assigned missions. Upon completion of the mission, pilots and crews are debriefed. Such debriefings supply valuable information regarding the execution of the mission and its effect upon the enemy, enemy resistance encountered, and enemy tactics and techniques. This information can be of material assistance in planning and executing future air and ground operations.

g. Conduct of Briefings.--Briefings are oral combat orders. As such, they are a function of command. They should be concisely worded, factual presentations of information to include all essential data necessary for the successful completion of the combat air mission. The preparation and conduct of the briefing is the staff responsibility of the operations and intelligence sections, with assistance provided from other staff sections

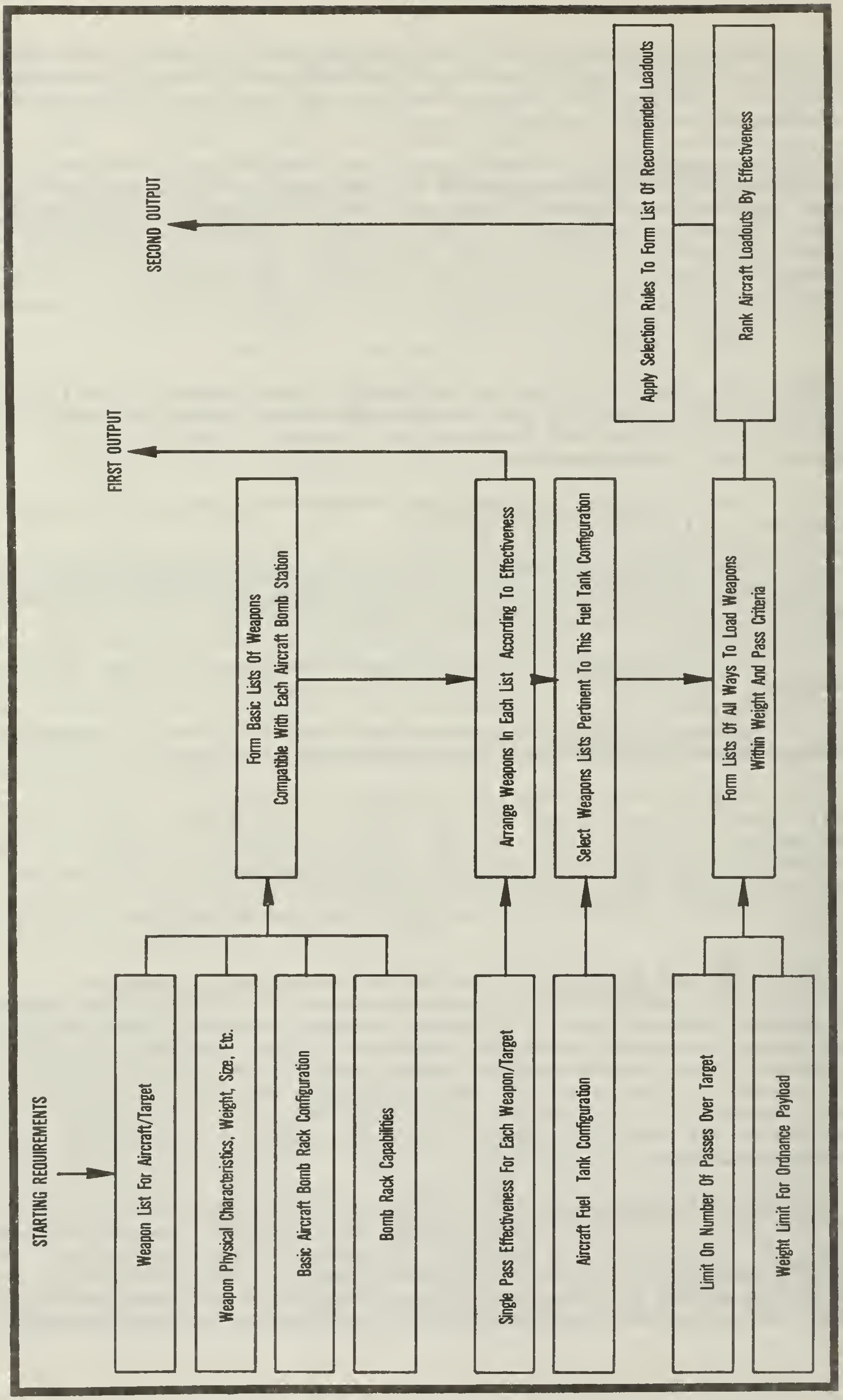

STARTING REQUIREMENTS
Weapon List For Aircraft/Target
Weapon Physical Characteristics, Weight, Size, Etc.
Basic Aircraft Bomb Rack Configuration
Bomb Rack Capabilities
Form Basic Lists Of Weapons Compatible With Each Aircraft Bomb Station
FIRST OUTPUT
Single Pass Effectiveness For Each Weapon/Target
Arrange Weapons In Each List According To Effectiveness
Aircraft Fuel Tank Configuration
Select Weapons Lists Pertinent To This Fuel Tank Configuration
Limit On Number Of Passes Over Target
Weight Limit For Ordnance Payload
Form Lists Of All Ways To Load Weapons Within Weight And Pass Criteria
Rank Aircraft Loadouts By Effectiveness
Apply Selection Rules To Form List Of Recommended Loadouts
SECOND OUTPUT

Figure 20.--Ordnance Selection Process.

as required. The normal briefing staff is composed of four officers: operations, intelligence, communications, and aerology. Small, routine missions may be briefed by a single officer. Combat briefings are generally conducted at the group level since this is the level in Marine aviation which normally has available all pertinent intelligence information pertaining to assigned missions. This briefing is generally attended by all participating personnel. Depending upon the number of pilots involved, only flight leaders or their personnel may attend this briefing if so directed. Upon completion of the group briefing, additional briefings as necessary are then conducted at squadron level. In addition to the group and squadron briefings, it is normal for each flight leader to augment the general briefings with a briefing concerning specific details applicable to his assigned flight. Information to be included in a combat briefing generally includes:

(1) Target information and means of target identification.

(2) Type and extent of target damage desired with instructions as to proper ordnance selection and fuze settings.

(3) Flak analysis of the target area and the routes to and from the target area.

(4) An appraisal of enemy electronics countermeasures that could affect the mission.

(5) A description of the character of the indigenous population and pertinent escape and evasion material.

(6) Weather briefing as to the target area, the routes to and from the target, and probable weather at the recovery or home base upon return.

(7) Information concerning authentications, codes, signals, passwords, terrain, and survival.

(8) Other pertinent essential elements of information (EEI's) of the commanders for overall intelligence information.

h. Conduct of Debriefings.--Debriefing is the process of collecting information about the enemy from combat crews. The debriefing usually includes any information relating to the results of the assigned mission, information required by the collecting plan of higher echelons, air and ground enemy action, unusual sightings, weather and friendly losses or damage caused by enemy action. By debriefing combat crews, the air intelligence officer obtains valuable information concerning the enemy order of battle; enemy reaction; enemy tactical and technical developments; any new enemy forces, equipment, etc., that were observed; and other information of a similar nature.

i. Aircraft Reporting In/Out (RIO) Procedures.--All aircraft report in to the TACC when entering, departing, or operating within the objective area, except when directed to report directly to a subordinate control agency. When pilots have completed their mission, they check out with the same agency or agencies. These reports, referred to as "reporting in/out" information, are maintained by the concerned control agencies until the pilot has checked out and the information has been recorded. RIO information will vary in content depending on the aircraft mission and control agency concerned. Similarly, information transmitted to the pilot upon reporting in will depend on his mission and the control agency involved. Tactical air traffic control (TATC) nets are the communication means used for the exchange of this information. Pertinent information on preplanned missions and ground alert aircraft is provided to the air control agencies by daily fragmentary orders, the MAGTF aviation element headquarters, the MAG's, and the other control agencies. This information is updated as necessary, displayed in each air control center for ready reference, and sequentially completed as aircraft launch, execute missions, and land. Each major air control center maintains current status information on appropriate preplanned, ground alert, and airborne aircraft. RIO information comprises an essential part of this status information vital to the success of the MACCS.

j. Communications.--An effective exchange of information between the ground and air elements of an MAGTF is vital for the success of the mission. Because there are many functions within Marine aviation involving ground and air coordination, many communication nets are required to provide the vehicles for exchanging information. If air support is to be responsive, both the air and ground commander must have a thorough knowledge of the communication nets needed and how they should be used. For detailed information concerning MAW communications, consult FMFM 10-1, Communications. The Navy-Marine Corps close air support command and control network is shown in figure 21.

(1) Needs of the Ground Commander.--The ground commander, to satisfy his offensive air support requirements, must be prepared to communicate via the following means:

(a) Tactical Air Request (TAR) Net.--The TAR net is established by the DASC for providing the TACP with a direct line of communication for close air support. It is monitored by the division, regiment, and battalion TACP's and also by the ASRT's.

(b) Land Line.--A land line link is normally established between the FSCC and the DASC to accomplish coordination in the areas of flight safety.

(c) Visual Means.--Various visual means of communication will be used by the ground commander's representatives as an aid in controlling aircraft. These means may include signal smoke, star clusters, visual panels, lights, mirrors, and other aids that may be visually identified from the air.

(2) Needs of the Air Commander.--Once the requirement for air support has been established through the TAR or HR nets, the air commander must have a vehicle to process the request and control the aircraft assigned to the mission.

(a) Processing CAS Requests.--The request for CAS or direct air support (DAS) is accomplished through the tactical air command net. It is activated by the TACC and will be used to procure the assets to meet the requirements of the ground commander.

(b) Controlling Offensive Air Support.--The aircraft obtained through the TAC net are directed to the target or terminal controller via

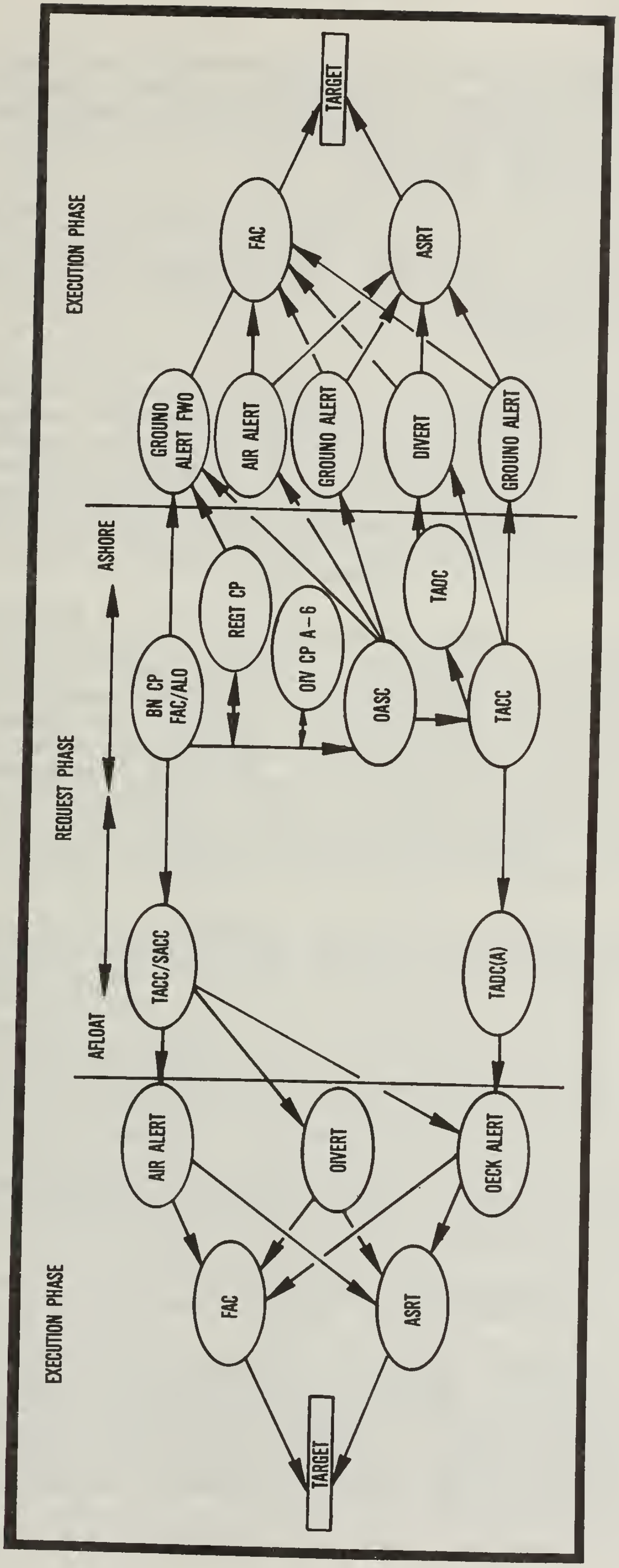


Figure 21.--Navy/Marine Corps Close Air Support Command and Control Network.

the tactical air direction net. The aircraft must have the necessary information to perform the assigned mission. This information might include navigational assistance, target brief, and advisories concerning inflight safety. When aircraft arrive in the target area, control will be shifted to the terminal controller.

(3) Communication With Agencies External to the MAGTF.--The nature of air control is such that a requirement exists for communication with agencies external to the MAGTF. For a discussion of this requirement, see FMFM 5-1, Marine Aviation.

3402. PRE-D-DAY OPERATIONS

During the preparation of the landing area for the amphibious assault, AAW operations are intensified to destroy the enemy's air potential and to gain air superiority in the objective area. Once air superiority is attained, offensive air support missions are conducted against enemy installations on and in the vicinity of the landing beaches, helicopter approach and retirement lanes, helicopter landing zones, concentrations of enemy troops, enemy gun emplacements, and vehicle convoys. Additionally, strikes are conducted against targets of opportunity.

a. Collection of Target Information.--During the planning phase of an amphibious operation, information relating to enemy airfields, communication systems, and other installations is obtained from amphibious objective studies and from target lists maintained by fleet commanders, the commander amphibious task force, and landing force aviation. Information concerning recently developed enemy installations, and deployment and movement of enemy forces is provided by amphibious reconnaissance elements and by friendly agents within the objective area. Information is also gained by employment of aerial photographic and electronic reconnaissance means. By carefully evaluating the information collected from all sources, the most important deep air support targets are selected.

b. Deep Air Support.--Deep air support is air action conducted against enemy targets at such distance from friendly forces that detailed integration of each air mission with fire and movement of friendly forces is not required. Deep air support is normally conducted beyond the fire support coordination line, and beyond the range of the preponderance of other supporting arms. Targets in deep air support include the enemy's fighting forces, equipment and supplies, communication systems, and support installations. Deep air support missions are normally coordinated and controlled exclusively at higher echelons of command and are of lesser immediate concern to the ground elements than close air support missions. Simply stated, deep air support operations are directed against enemy targets not in the immediate vicinity of friendly forces and conducted for the purpose of isolation of the battlefield and destruction of enemy forces.

c. Aerial Interdiction.--Aerial interdiction is one of the most important tasks of Marine aviation units in the deep air support role. Its purpose is to isolate, restrict, or deny to the enemy, use of a particular area, route, or facility. Aerial interdiction operations generally achieve greatest success when the ground battle is characterized by great movement and strong offensive pressure by either combatant. During these tactical situations, the enemy rate of consumption of supplies and movement of troops and equipment are greatly increased resulting in lucrative targets for aerial interdiction of rail and road nets. All-weather Marine Corps aircraft provide a 24-hour-a-day capability to interdict the enemy's reinforcement and supply routes. For example, enemy armor presents one of the greatest threats to the success of an amphibious operation and aerial interdiction missions are one of the most effective means to combat this threat because of aerial mobility to mass large numbers of aircraft and flexibility in the types and amount of ordnance. When the supply consumption of an armored division is considered, it can readily be seen how interdiction by aircraft can prevent the constant flow of logistic support that is necessary to an armored unit's effectiveness.

d. Destruction of Enemy Forces.--Destruction missions are conducted for the broad purpose of destroying the enemy, his equipment and supplies, his installations, and his personnel. When the movement of the enemy has been hindered by interdiction, he must be attacked in place to accomplish destruction. Weapon and fuze combinations are selectively employed to effect the destruction of the enemy's means of resisting the landing force. Failure to make proper ordnance selections will result in the utilization of all aviation assets without measurably affecting the enemy's capability to resist. Reference must be made to the FMFM 5-2 series, Joint Munitions Effectiveness Manual, to ascertain which weapon and what method of employment is necessary to destroy a given target. Emphasis will be given to to enemy concentrations and emplacements nearest the landing beaches/zones and along the approach and retirement lanes.

3403. D-DAY OPERATIONS

On the day the landing commences, offensive air support operations, which began prior to D-day, continue. Neutralization attacks continue in the landing area until immediately prior to the landing of the leading waves. After landing, airstrikes are shifted to other selected targets to provide assault elements continuing support. All available attack aircraft, including F-4's not engaged in AAW missions, are assigned specific targets or areas which pose a threat to the landing force. Airstrikes emanate outward from the landing beaches or zones for deep air support, including interdiction of enemy formations, convoys, and lines of communication.

a. Airstrikes Prior to H-Hour.--On D-day, prior to H-hour, numerous airstrikes are made on the landing beaches to inflict maximum damage to enemy defenses. These strikes consist of bombing, strafing, rocket, incendiary, or nuclear attacks.

(1) Rocket and Bomb Attacks.--These attacks are made against selected targets derived from the latest intelligence. Emphasis is placed on armored or revetted installations capable of bringing direct fire to bear on the landing beaches and their approaches.

(2) Strafing and Incendiary Attacks.--These attacks are executed as the landing craft and helicopters make their final approach to their respective beach or zone. Once the troops have landed, terminal air support control agencies with the assault elements (FAC) or airborne (AFAC), direct strike aircraft to targets in the immediate vicinity of, and beyond, the landing beaches, or outward from the helicopter landing zones.

(3) Ordnance Delivery.--Offensive air support aircraft are becoming more vulnerable to antiaircraft artillery (AAA) and surface-to-air missiles. Attacks that run parallel to frontlines and those attacks that run deep in enemy territory may result in extensive exposure to the antiair threat. In this type of environment, it may be more desirable to alter CAS delivery tactics so that attacks are made perpendicular to the

FEBA, with a pullout prior to crossing frontlines. Although this procedure does not provide maximum safety for friendly troops, it may prevent excessive aircraft losses to enemy fire. TV and laser-guided weapons have increased standoff distance for deep air support missions by allowing weapon release outside of AAA and some SAM envelopes. During any offensive air support operation, however, a compromise must be made between maximum effect of the weapons used and minimum exposure to enemy fire.

b. Typical Time Schedule for H-Hour Strikes

(1) H-60 Minutes to H-35 Minutes.--Rocket and bomb attacks are conducted on targets on and close to the landing beaches.

(2) H-35 Minutes to H-20 Minutes.--Incendiary attacks are conducted on the beach and flanks.

(3) H-10 Minutes to H-5 Minutes.--Smoke missions are executed to conceal movement of approaching boat waves.

(4) H-4 Minutes to H-3 Minutes.--Strafing attacks are conducted along beaches, moving inland as the assault waves advance ashore.

c. Adjustment of Time and Type of Attacks.--The time and type of air attacks in support of the amphibious assault may be changed as required because of varying local conditions or fluctuations in the speed of the landing craft in the first assault wave. Once the landing craft are within 1,000 meters of the beach, their position, rather than time, becomes the governing factor in the execution of the close air support operations. After the H-hour airstrikes have been completed, support aircraft on station continue to attack enemy defenses opposing the landing force.

d. Close Air Support After H-Hour.--As the ground troops advance ashore, CAS operations must be very closely coordinated and controlled. These operations will be both preplanned and on call. Preplanned airstrikes will cover the advancement of the assault forces, directing their fire at targets pinpointed by forward air controllers, both on the ground and airborne. When additional targets are discovered, or when resistance is greater than anticipated, additional aircraft are called from ground or airborne alerts, or diverted from other missions to supplement the prescheduled aircraft already on station.

(1) Preplanned Missions.--A preplanned mission is an airstrike on a target which can be anticipated sufficiently in advance to permit detailed mission coordination and planning. They are scheduled missions to be executed when specifically requested by the supported unit. Positive approval at each intermediate command level is required prior to execution of a preplanned mission. When initiating a preplanned mission request, the requester will complete section I of the request form (see app. A), and forward it through the requester's channels to the TACC. The ground commander may specify in his request the following types of air support response desired:

(a) Specific time on target (TOT).

(b) Specific ordnance.

(c) Airborne or ground alert.

(d) Air support radar team or radar beacon delivery.

(2) Immediate (On-Call) Missions.--An immediate or on-call mission is an airstrike on a target which could not be identified sufficiently in advance to permit detailed mission coordination and planning. Immediate missions may be provided by ground or airborne alerts, or by diverting aircraft from a preplanned mission. The requester will complete section I of the request form (see app. A). Tactical air control parties forward the data to the DASC or the TACC.

(3) Mission Briefing for Immediate or On-Call Missions

(a) If time and mission urgency permit, the flight is briefed prior to scramble. If not, the mission is briefed after the flight is airborne. Pilots should be provided:

1 Mission number.

2 Estimated TOT.

3 Control point/rendezvous coordinates/navigational aid (NAVAID) fix.

4 Initial contact (call sign and frequency).

5 FAC/ASRT/TAC(A) call sign and frequency.

6 Restrictive fire/air plan information.

7 Target description.

8 Target coordinates and elevation.

(b) When a flight is diverted or is on airborne alert, the briefing will be given by the appropriate control element while the aircraft is orbiting or is en route to the target.

(4) Terminal Control Procedures.--Terminal control is provided by any of several agencies (TACP, TAC(A), AFAC, or ASRT) with the approval of the supported ground commander. It begins with the arrival of the flight at the contact point and is carried out as follows, unless modified by the operation plan.

(a) The flight leader will initiate radio contact with the FAC or AFAC using the designated call sign and frequency and providing the following information:

1 Flight call sign.

2 Mission number.

3 Number and type of aircraft.

4 Ordnance (and fuzing, if not instantaneous).

5 Position and altitude.

6 Time to BINGO.

(b) The FAC or AFAC will provide the flight with information necessary for the attack. The following minimum information will be briefed to the flight in standardized format:

1 Target location and description.

2 Target elevation.

3 Attack instructions.

4 Target and friendly location information that contributes to safe conduct of the mission, including restrictive fire/air plan (when necessary.)

(c) The FAC will visually acquire the flight if possible, except in emergency.

(d) The flight observes the FAC's position, if possible, or will visually acquire the AFAC's aircraft (when applicable) prior to commencing the attack.

(e) The flight acquires the target (and friendly positions when they are a safety factor).

(f) Each member of the flight attacks the target and delivers ordnance only when cleared by the FAC (or AFAC).

e. Fixed-Wing Support of Helicopters.--Offensive air support aircraft may be tasked to provide helicopter escort and deliver fires for landing zone preparation.

(1) Helicopter Escort Missions

(a) Armed escort should be provided for all helicopter assault movements, unless the routes and landing zones are known to be secure. Five general types of helicopter missions require armed or attack escort:

1 Escort of assault transport helicopters through and into areas not secure or controlled by enemy forces.

2 Escort and attack cover of resupply helicopters flying through insecure areas into secure sites controlled by friendly forces.

3 Aircraft on station to cover retrieval of downed helicopters.

4 Escort of medical evacuation flights into insecure zones.

5 Cover and escort of reconnsissance insertion or extraction operations.

(b) Overall mission control of aircraft involved in helicopter assaults is exercised by the tactical air commander through the TADC and DASC. Fixed-wing escorts will be passed to a DASC from TAOC to receive mission, rendezvous, and communication instructions. Although mission control will be with the DASC, direct control will be by airborne coordinators or the transport helicopter commander. If employed, the TAC(A) has overall control of all aircraft in support of and conducting the helicopter assault. The helicopter coordinator (airborne) has control of all helicopters involved in the assault, or if an HC(A) is not assigned, the helicopter transport commander. AFAC directs airstrikes in the landing zone area. Fixed-wing aircraft escorting resupply helicopters will be controlled by the TAC(A). If attacks near the landing zone are needed prior to the helicopter landings, control of fixed-wing escorts can be passed to the AFAC for direction of such strikes. If the escorts are not required for prelanding strikes of the landing zone, they may be employed as air alert cover over the landing zone under TAC(A) or AFAC control.

(2) Weather Factors.--Weather must be carefully considered during planning of fixed-wing supported helicopterborne operations. Low ceilings and poor visibility severely curtail fixed-wing operations, especially in their ability to deliver ordnance. Preparatory landing zone strikes generally require ceiling and visibility minimums of 2,500 feet and 3 miles. Effective escort operations in adverse weather conditions rely heavily on the terrain and the altitude of the helicopter formation. A minimum of 500 feet is required between the helicopters and the ceiling for fixed-wing to maneuver. Terrain clearance between the base of the clouds and the high ground en route is also a major controlling factor. If adverse weather prevents landing zone preparation and/or sufficient maneuvering room for helicopter escorts, it may be advisable to postpone or cancel the helicopter operation.

3404. POST-D-DAY OPERATIONS

Post-D-day air support operations are planned in general terms since mission requirements depend upon the development of the ground tactical situation. Applicable pre-D-day and D-day type operations continue. Plans must provide continuous and adequate support for landing force operations progressing ashore including the transition from carrier-based to land-based air support. In those instances where there are no suitable airfield facilities within the amphibious objective area (AOA), the air element of the landing force will establish expeditionary facilities from resources available to each MAG. The various expeditionary airfield components have been designed in such a manner as to permit the tactical commander to have maximum flexibility for assembling a variety of airfield configurations. This flexibility provides the opportunity to initially install VTOL forward sites and V/STOL forward operating facilities, and subsequently to expand these facilities, building-block fashion, into full-scale expeditionary airfields. The expeditionary airfield components may be picked up and moved within the AOA and are recoverable for future use. Additional V/STOL considerations may be found in section VIII.

a. Phasing of Control Ashore.--As soon as practical, the CLF establishes air control facilities ashore in order to provide increased surveillance, more rapid response, and a landward extension of the ATF's weapons control capabilities. Initially, air control agencies ashore operate in a standby status monitoring all air control circuits. Once the agencies ashore are satisfactorily established, the tactical air situation allows, and upon recommendation of the CLF, the CATF decides whether to phase responsibility for air control ashore and according to what type and degree. As the MACCS becomes functional, the CATF may pass all or portions of air control responsibility to the CLF. In a continuing sequence, the agencies afloat are relieved of responsibility but continue to monitor the appropriate categories of control, participating when necessary. Regardless of the degree of participation, these afloat agencies will remain prepared to act as backup or alternate agencies until the termination of the amphibious operation.

b. Phasing Direct Air Support Control Ashore.--Facilities for the control of direct air support are phased ashore in proportion to the buildup of the landing force ashore.

(1) Tactical Air Control Party.--The TACP's are the first elements of MACCS ashore. FAC parties of the battalion TACP's generally accompany frontline companies during all phases of the amphibious operation. During the initial phase of the assault, the FAC controls aircraft executing missions in support of the battalion. Aircraft are provided by the TACC (afloat). Following the establishment of the DASC ashore, aircraft will be requested from and provided by the DASC.

(2) Direct Air Support Center.--In order to assist in the coordination of supporting arms and to provide an agency ashore for the control and direction of direct air support, the first aviation air control agency to go ashore is normally the DASC. The DASC is usually landed in the same manner, and at approximately the same time, as the senior ground combat fire support coordination center and collocates with this FSCC provided that this FSCC has the assigned responsibility for controlling supporting arms. The specific composition of the DASC will be tailored to meet the situation, but in all cases, it has the capability to control and direct required direct air support missions. Passing the responsibility for the control and direction of direct air support ashore most logically occurs when the necessary facilities have been established and the beachhead has become relatively secure. At this time, some degree of stabilization in the volume of close air support, air reconnaissance, and assault support missions will have evolved. The decision to formally activate the DASC is based upon the recommendations of the CLF and the tactical air officer to the CATF. This activation depends upon the tactical situation and the success of the DASC in establishing the necessary facilities, particularly communications, to gain an adequate grasp of the existing air situation. The DASC then, gradually begins to participate in the control and direction of direct air support missions. The most readily identifiable starting point for this participation is with immediate air request missions and those preplanned flights whose mission requires close coordination with other fire support means. As the DASC assumes this responsibility, it processes requests from TACP's, AFAC's, NAO's, HC(A)'s, etc. Air resources, made available by the TACC (afloat) and the HDC, are assigned to terminal control agencies. From this point, the DASC continues to assume a greater responsibility for the control and direction of direct air support, expanding its capacity until it is capable of, and has been assigned, the responsibility for handling all missions. This status is normally attained by the time the preponderance of landing force artillery is ashore and is functioning through the senior FSCC assigned the responsibility for controlling supporting arms.

(3) Air Support Radar Team.--Should the situation dictate, one or more ASRT's are established ashore to provide all weather, close support bombing control. The DASC provides operational direction of and mission assignment to the ASRT. Initial mission assignment to the ASRT is made by the TACC (afloat) and coordinated through the DASC. Subsequent mission assignment is made by the Marine TACC/TADC, once established ashore. The force antiair warfare coordinator/sector antiair warfare coordinator (FAAWC/SAAWC) conducts the radar controlled handover of aircraft to the ASRT until the landing force air surveillance radar system is established ashore.

(4) Tactical Air Operation Center.--As the beachhead expands, air defense elements of the MACCS are phasing ashore. The introduction of other functional control elements ashore, in addition to the DASC, requires centralized coordination of MACCS functions to preclude mutual interference and to attain unity of effort. Although the primary responsibility of the TAOC is to establish the control and direction facilities for the landing force air defense system, it has the capability to perform limited functions as a TADC. This capability is primarily limited to the processing of fixed-wing aircraft, including those conducting direct air support missions while coordinating with the TACC (afloat) and the DASC. The control and direction of helicopters continues to be exercised by the HDC and the DASC. This TADC responsibility is assumed by the actual TADC (ashore) when established.

(5) Tactical Air Command Center/Tactical Air Direction Center.--Generally, the last MACCS agency activated is the TACC/TADC. The facilities for the TACC/TADC may be established ashore concurrently with other MACCS agencies; e.g., TAOC. This agency, when activated, is initially designated a TADC and functions under the cognizance of the TACC (afloat). The TADC is the senior MACCS agency and is responsible for the centralized command and direction of the activities of its subordinate agencies in the MACCS. This includes all direct air support operation. If and when the responsibility for the control and direction of all air operations in the objective area is passed to the CLF by the CATF, the TADC is designated as the TACC. The TACC (afloat) is simultaneously redesignated a TADC, subordinate to the TACC (ashore).

c. Coordination of Air Support With Other Fire Support Means.--The characteristics of aircraft, particularly their mobility, require that specific attention be given to their integration with other fire support means. Simply orbiting on station may take close air support aircraft across battalion and even regimental boundaries. The activity of these aircraft must be coordinated to meet force priorities and safety requirements with other air activity. Due to problems imposed by aircraft availability and their speed of movement, control is centralized at the highest level of the MAGTF. This centralization is required to ensure economical use of resources and to provide flexible response for the entire MAGTF ground combat element. Centralization of control dictates a process wherein air support is requested from a central, functional, control agency, the DASC in the case of direct air support. Immediate and on-call requests to the DASC are screened by intermediate ground command echelons for approval. The significance of this requesting procedure is that each intermediate echelon must examine the location and status of any artillery or naval gunfire missions in progress, the availability and suitability of other supporting arms for the mission, and other requirements for available air support within their area of responsibility. The process of approval allows higher echelons the opportunity to disapprove when more pressing requirements for air support exist elsewhere or when higher priority fire missions would have to be either checked or terminated in order to accomplish the requested air mission. Fire support coordinators at each echelon also compare the type and location of the target with the type aircraft and requested ordnance. This comparison is for followup purposes and does not delay the approval or disapproval. Provisions of this nature are established within the MAGTF to ensure flexibility and rapid integration of air with other supporting arms. In order to accommodate this function, a specific agency has been established within the MAGTF structure where all supporting arms activity of the particular unit is centrally reviewed, approved, coordinated, and displayed. Further, general control measures are employed which allow rapid and effective coordination when necessary.

(1) Fire Support Coordination Center.--The various FSCC's are the commander's agencies tasked to stay abreast of the supporting arms effort and to perform the necessary coordination. They are the only agencies which combine the communications and personnel required to plan, receive, process, implement, and forward information concerning artillery, air, and naval gunfire activity. The FSCC is a staff agency at each level of infantry command from the battalion through the command element of the largest MAGTF, the Marine amphibious force. Staffed by representatives of each of the supporting arms, FSCC personnel are closely attuned to the intentions of the commander and represent his interests in fire coordination matters. For decisions beyond their assigned responsibility, they establish immediate contact with the commander. They consolidate the summary information on supporting arms activity and assign the necessary control measures for continuous fire support.

(2) Coordination and Control.--Coordination and control measures delineate responsibility, restrict and control fires, and complement the effort of higher and adjacent units. Aircraft are subject to limitations in the execution of their missions in much the same manner as ground units. In the case of air support operations, the FSCL, airspace coordination areas, and SEAD requirements are of greatest concern and importance. These measures ensure that the ground commander maintains airspace utilization approval authority over his immediate airspace and that safety requirements for both aircraft and ground forces are met.

(a) Fire Support Coordination Line.--The FSCL is a line established by the appropriate ground commander to ensure coordination of fire not under his control but which may affect current tactical operations. The fire support coordination line is used to coordinate fires of air, ground, or sea weapons systems using any type of ammunition against surface targets. The fire support coordination line should follow well defined terrain features. The establishment of the FSCL must be coordinated with the appropriate tactical air commander and other supporting elements. Supporting elements may attack targets forward of the FSCL, without prior coordination with the ground force commander, provided the attack will not produce adverse surface effects on, or to the rear of, the line. The FSCL is normally located at the extreme ranges of artillery and naval gunfire. Inside the FSCL, coordination with other supporting arms is necessary and attack of targets must be coordinated with the appropriate ground commander. As a fire coordination control means, it serves the following two purposes:

1 Provides ground commanders with sufficient control of aircraft to ensure troop safety, aircraft safety, and coordination of airstrikes with ground maneuver; and precludes unnecessary duplication of supporting fires.

2 Provides aviation commanders, air control agencies, and pilots of aircraft with sufficient information to clearly delineate the degree of control or coordination required for aircraft to attack ground targets in the area.

(b) Airspace Coordination Area.--The ACA is a block of airspace in the target area in which friendly aircraft are reasonably safe from friendly surface fires. The ACA may occasionally be a formal measure (a three-dimensional box in the sky). Information included in dissemination, if a formal measure, will provide minimum/maximum altitude, length (two coordinates), width, effective date-time group (DTG). A typical ACA is illustrated in figure 22.

(c) Suppression of Enemy Air Defenses.--SEAD techniques are closely related to counterbattery fires and are employed in support of close air support aircraft. SEAD fires are directed against hostile anti-aircraft weapons that can fire on close air support aircraft during the

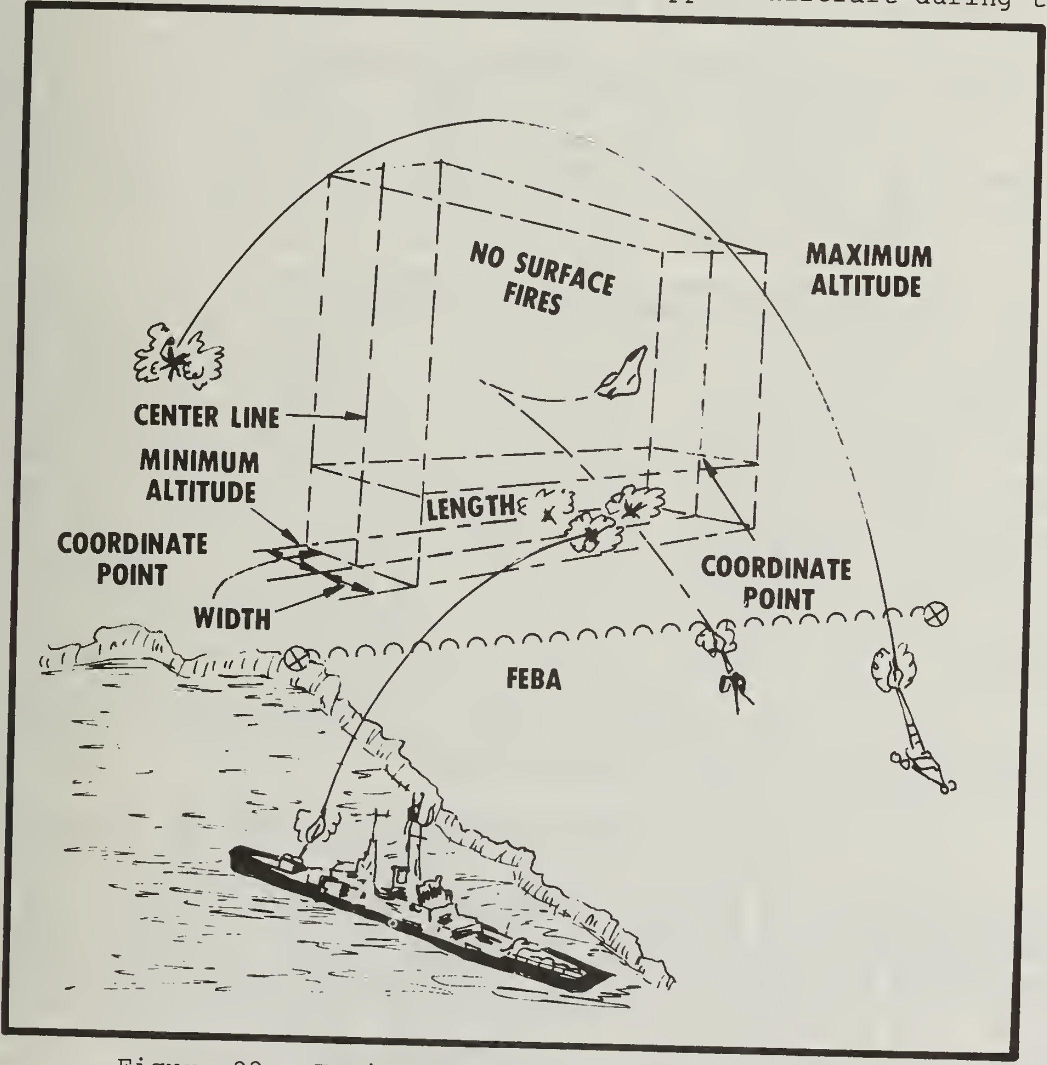


Figure 22.--Typical Airspace Coordination Area.

execution of their missions. SEAD fires are primarily delivered by artillery units; however, naval gunfire and other support aircraft possess this capability and may be employed to deliver these fires. Because of the detailed and close coordination required, SEAD fires are planned, coordinated, and controlled by the appropriate FSCC. The aviation representative in the FSCC plays a most important part in the planning of these missions. He is responsible for the preparation and use of SEAD templates that represent the area and time each type of aircraft will be vulnerable to antiaircraft fires during certain types of attacks. Approach and recovery distances vary somewhat with the type of attack (bombing, strafing, napalm, etc.), as well as with the type aircraft, speed, and special flight characteristics. The key to a successful SEAD mission lies in thorough planning and positive control of its execution. The SEAD mission is controlled directly by the forward air controller, airborne FAC, forward observer (FO), and/or when naval gunfire is utilized, by the shore fire control party (SFCP). These controlling agencies can be located side by side in an observation post or tied in with "hot lines" to ensure instant reaction. When aircraft are used in a SEAD role, control is provided by a TAC(A), FAC, or AFAC.

d. Conduct of Offensive Air Support Operations.--Offensive air support operations consist of a sequence of events designed to provide timely response to the air needs of the ground commander. The functional control agency for these operations is the DASC, collocated with the highest level FSCC assigned the responsibility for controlling supporting arms. This collocation enables the DASC to supervise and control the conduct of the offensive air support missions and to coordinate this air activity with other fire support means. In order to receive preplanned direct air support, the ground combat element consolidates its requests and forwards them to the MAGTF commander. The MAGTF commander then determines the mix of preplanned and immediate sorties by comparing the requests against the aircraft availabilities furnished by the aviation element. The determination of this mix is based upon a comparison of anticipated tactical requirements against the number of requests received. In a conventional warfare environment, preplanning for requirements is simplified by the relative stability of the situation. In other combat environments, particularly counterinsurgency, the identification of targets and the defining of requirements for preplanned status is more difficult due to the fluidity of the situation, plus the requirement to react to a number of potential situations. Immediate or on-call type missions provide optimum response in this instance. Therefore, care must be taken to limit preplanned mission requests to those which are definitely required. A problem sometimes encountered in such situations is indiscriminate preplanned targeting by units to assure availability of aircraft. This procedure draws down assets available for immediate missions. When the preplanned/immediate mission has been determined, the aviation element assigns the missions, ordnance, controlling agencies, and time on target, or time on station (TOS).

(1) Area Relationships.--Chapter 2 described the various agencies of the MACCS and defined the DASC's responsibility for overall coordination and execution of direct air support missions. The DASC is best suited to exercise this function for a division/wing combat team and is assigned responsibility for the offensive air support activity within a division's area of responsibility. Within that area, the DASC is the senior offensive air support functional agency and reports directly to the TACC/TADC. For operations involving more than one division, the assets of the MASS and the capacities of its DASC are usually insufficient to adequately provide for the increased span of control. Therefore, additional

DASC and ASRT capability must be provided, either by assignment of an additional MASS to the MAGTF, or by substantial personnel and equipment augmentation for the existing MASS. Under these circumstances, the TACC/TADC continues to provide overall supervision of the offensive air support control effort while ensuring that both DASC's effect coordination for matters of mutual concern. This relationship parallels that of adjacent TAOC's described in chapter 3.

(a) Areas of Responsibility.--In establishing the DASC, areas of responsibility of both the DASC and the supported ground unit is of paramount concern. The DASC must be located in such a geographic position that it will be able to control aircraft throughout its area of responsibility. It should be recognized that there may be instances whereby the DASC does not have the capability to control aircraft throughout the entire area of responsibilty of the major ground combat element it is supporting. In such an instance, the DASC's area of responsibility should not be arbitrarily extended to conform to the area of responsibility of the major ground unt supported by that DASC. Such a situation exists in a fluid environment when subordinate ground combat units operate at extended distances from the major ground combat element. Consequently, a number of factors must be considered to determine if a requirement exists for a second DASC capability. This includes the scope and length of the operation, distance of the ground units from the DASC, and the geographical characteristics of the area. Where such a need is identified, the requirement may be met by assigning the responsibility for offensive air support to an adjacent DASC or by establishing another complete DASC.

(b) Decentralization of Offensive Air Support Control.--In an operation where the MAGTF employs one DASC, the MACCS provides for decentralization of offensive air support control to this DASC. An operation involving two divisions would require two DASC's. Similarly, a division operation involving a sizeable subordinate element detached from the main ground element, such as a task force, would also require the use of a second DASC. In these two situations, one DASC cannot adequately support the entire MAGTF ground combat element in performing the necessary offensive air support control and fire support coordination tasks. When the size and tactical employment of the MAGTF ground combat element dictates the decentralization of fire support coordination, the offensive air support control function must be correspondingly decentralized by the establishment of additional DASC's. In this manner, specified ground combat elements receive an accompanying offensive air support control and coordination capability. The varying configurations of the SASC perform their functions within their capabilities for the supported organization. In all cases, overall command and control of the MAGTF air assets remains centralized in the TACC/TADC, while subordinate offensive air support control agencies provide decentralized control according to specified operational guidelines. In this manner, adequate response to the offensive air support needs of the entire MAGTF is ensured.

(2) Providing Direct Air Support.--In providing direct air support to requesting units, the process is twofold. The first involves determining the appropriate mix for immediate and preplanned missions and its subsequent assignment. The second involves the method and authority to divert preplanned missions once airborne.

(a) Preplanned/Immediate.--The allocation process provides for the assignment of aircraft to a preplanned/immediate mix. Preplanned missions and requirements for aircraft on standby alert are assigned to specific aviation units by a daily fragmentary operation order. The same frag order is distributed to the TACC/TADC, TAOC, and the DASC. The frag order also designates the anticipated terminal control agency for scheduled missions; e.g., FAC, AFAC, TAC(A), and ASRT. Readiness conditions for the aircraft on alert and hot pad locations are also specified. The DASC confirms the preplanned missions with the appropriate terminal air support control agency and ensures that the terminal controller is prepared to receive his scheduled missions.

(b) Diverts.--Should an occasion arise in which the terminal controller cannot work his scheduled missions, provisions have to be made for another terminal controller to be assigned the scheduled air or the mission is cancelled. In many instances, the unavailability of a terminal controller to accept missions cannot be determined until the flight is airborne. Similarly, emergency or high priority situations will arise which require offensive air support response at that time. In both of these instances, the requirement for flexibility dictates that air control agencies be capable of diverting missions to another terminal controller or to the location of the emergency or priority mission. Three general parameters affect the decentralization of offensive air support authority to the various air control agencies:

1 Available Resources.--If available aviation resources exceed requests for direct air support, divert authority need not be exercised unless time is extremely critical. Generally speaking, response times of on-call ground alert aircraft usually equal the time required by the DASC to contact a terminal controller and aircraft, to disengage the aircraft from its present mission, and for the aircraft to proceed to the location of the higher priority mission. An exception to this is when aircraft coincidentally report in for a preplanned mission just as the higher priority request is received. However, if resources are limited and the activity of ground alert aircraft is high, the only existing alternative is to divert aircraft from a lower priority mission in order to meet the need. It should be noted here, that when such a situation arises, the DASC's proximity to the senior air representative with the ground combat element allows decreased reaction time while preserving the supported unit's ability to make their own determination as to where and how assigned air will be employed.

2 Sources of Requests.--The sources of requests will also condition the level of decentralization of divert authority. In an amphibious operation, problems are minor because all requests are processed through ground combat element TACP's. However, the key factor is identification of the agency which ultimately receives all the requests from all the authorized requesting agencies. In any joint or extended operation, provision must be made to accommodate the receipt of requests for both immediate and preplanned direct air support from parallel ground combat elements and from elements external to the ground combat elements of the MAGTF involved; e.g., the combat service support (CSS) elements. Normally, in these instances, general divert authority should remain with the agency ultimately receiving all requests; for only at that level can relative priorities be properly identified. An exception to the normal rule which increases responsiveness and reduces reaction time should be to decentralize divert authority to a major combat element's air control agency for the block of aircraft received regularly on a daily basis. In the previously quoted examples of two or more equal and parallel ground combat elements or a using combat service support element, the TACC/TADC would

retain overall divert authority to meet priorities assigned by the MAGTF command element. Simultaneously, and to ensure minimum reaction time, it could also assign divert authority for regularly fragged assets to each DASC in the case of two or more equal ground combat elements, or to the ground combat element's DASC, in the case where other users are administrative and/or logistic in nature. Such decentralization ensures tactical responsiveness, but does not preclude an overall capability to rapidly respond to nontactical requirements.

3 Type of Aircraft.--A third conditioning factor in the decision to decentralize divert authority is the type of aircraft involved. A relatively complex decision making process may be acceptable for aircraft with high endurance on station. Frequently, aircraft characteristics, the distance of the target from air bases, and the time on station required necessitates immediate decisions concerning mission assignment. Therefore, many situations will dictate that the controlling DASC be empowered with divert authority over all scheduled missions. The DASC is in the best position to rapidly identify changing situations, receive these changes directly from the supported ground combat element, and communicate directly with all of the ground combat element's terminal controllers.

(3) Air Requests.--The process of requesting preplanned direct air support has been previously discussed. This paragraph will discuss the process of requesting immediate direct air support missions.

(a) Types of Air Requests.--Immediate direct air support involves requests for fixed-wing air support. Requests may involve close air support aircraft, nighttime flare drops, or other missions such as harassment and interdiction.

(b) Sources of Air Requests.--The majority of immediate air requests are made by the FAC's of ground combat units, but requests may originate from other sources such as the TACC, FSCC, and TAC(A). Requests are initially made by the FAC to the DASC on the prescribed net for the type of aircraft required; i.e., tactical air request for fixed-wing. Air officers at intermediate FSCC's monitor the request nets and indicate approval by their silence. The request itself contains a logical and sequential arrangement of the information required to conduct the mission. See appendix A for a standardized tactical air request and appendix C for a CAS briefing form. Further, requesting agencies are responsible to know aircraft capabilities and the weather minimums for the general types of missions.

(c) Processing Air Requests.--The DASC assigns a request number to each request form which includes the information passed by the requesting agency. The request is then matched against the availability of aircraft for immediate response. If the priority of the request allows, preplanned missions are also considered if their scheduled ordnance loads are appropriate. Airspace coordination areas, fire support missions, and other limiting factors which may be unknown to the requester must be reviewed. If the request is received on other than the TAR net, the DASC coordinates with the appropriate FSCC to ensure concurrence on the use of close air support. The DASC assists in planning SEAD fires and ACA's, and ensures aircraft are cleared for entry into the ground commander's airspace. The senior air director (SAD) in the DASC is responsible for finally approving the method of filling the request and for ensuring the necessary fire support coordination. If all sources of aircraft available to the DASC are exhausted, the DASC requests aircraft from the TACC. Once aircraft are assigned, the DASC confirms the controlling agency and assigns the tactical air direction (TAD) frequency for the mission.

(4) Mission Briefing.--Once aircraft assignments for air requests are completed, the DASC briefs all participating elements according to the type of mission and the terminal control agency's familiarity with the specific mission.

(a) Requesting Agencies.--The DASC briefs requesting agencies on the status of approved requests. This briefing includes the number and type aircraft, aircraft call signs and mission numbers, ordnance load (if applicable), estimated TOT or TOS, and the call sign and frequency of the terminal control agency. The DASC further keeps all requesting agencies informed of delays, modifications, or cancellations which arise. If a request cannot be filled, the DASC briefs the requesting agency immediately and, whenever possible, notes the reason for inability to comply. This allows the requesting agency to make alternate plans or to reevaluate factors which might have precluded filling the request; e.g., assigned priority.

(b) Terminal Control Agencies.--The DASC is responsible to brief terminal control agencies on the details of each mission. Each terminal control agency has specific briefing requirements which must be met. The FAC's, AFAC's, TAC(A)'s, and the ASRT's are the terminal control agencies for close air support.

1 Forward Air Controller.--Usually the FAC controlling a mission is the requesting agency and therefore has the necessary information on the target coordinates, target description, location of proximate friendly units, and aircraft heading restrictions, if appropriate. The FAC receives the following information from the DASC:

a Number and type of aircraft.

b Aircraft call signs and mission numbers.

c Ordnance load.

d Estimated TOT.

e Assigned orbit point and altitude (if applicable).

f Assigned TAD net

g Airspace coordination areas/fire support coordination measures in effect.

2 Tactical Air Coordinator (Airborne) and Airborne Forward Air Controller.--The TAC(A)/AFAC is often working with the ground unit which has requested air support and already possesses the necessary target information. TAC(A)'s working independently and requesting aircraft for targets of opportunity also possess this target information. If the TAC(A) is not aware of the request, a briefing will be provided by the DASC. When providing CAS to a ground unit, the TAC(A)/AFAC is instructed to contact that ground unit. The TAC(A)/AFAC requires the following information to conduct his mission:

a Call sign and frequency of supported unit.

b Location of proximate friendly units.

c Target coordinates and description.

d Time when the target is cleared for air attack.

e The information described in subparagraph 1 above.

3 Air Support Radar Team.--The ASRT as a subordinate agency to the DASC is not usually in contact with the supported unit. Further, its function of medium and high altitude, close support bombing control may dictate that it control multiple aircraft over a large area in a relatively short period of time. The ASRT requires the previously described briefing on the assigned aircraft and the following additional information:

a Target number.

b Target coordinates (eight digits).

c Target description to include size and configuration for area targets.

d Target precedence.

e Time frame target is cleared for strike.

f Restrictive run in headings (if applicable).

g Mission type (close or deep air support, harassment, interdiction, or destruction).

h Friendly unit locations or populated areas close to the target.

i Specified GCI/ASRT handover frequency.

(c) Aircrews.--The DASC briefs aircrews of support aircraft on the missions assigned. Reporting in/out procedures are discussed in paragraph 3401i.

(d) Close Air Support.--A general briefing is given to CAS aircraft which outlines the general parameters of the mission. A detailed briefing is given by the terminal control agency once the aircraft arrive at their assigned position. The DASC passes the following information to the aircrew:

1 Type mission.

2 Call sign and type of terminal controller.

3 Orbit point and altitude.

4 Airspace coordination area.

5 Target description.

6 Location of other aircraft in the target vicinity.

7 Control frequency.

(5) Execution.--There are three phases applicable to mission execution. These are control of aircraft to the terminal control agency, control of aircraft by the terminal control agency, and control of aircraft from the terminal control agency.

(a) En Route Control to Terminal Control.--The process of en route control requires coordination of the aircraft flight path with other airspace utilization activities. Flight to the terminal control area may involve transiting airspace being utilized by other offensive air support aircraft, other fire support means, and other aviation activity, such as air defense or air reconnaissance. Two agencies are primarily employed for this control:

1 TAOC.--The TAOC has the capability of providing positive radar control or radar flight following services to offensive air support aircraft. Such control is limited for aircraft flying at low altitude due to radar limitations and geographical characteristics of the area. TAOC en route control to a terminal control agency is integrated with air defense aircraft and missile activity. Control may consist of a radio and/or radar handover to an intermediate control agency, such as another TAOC or a DASC, or a handover direct to a terminal control agency, such as an ASRT.

2 DASC.--The DASC maintains current information on the coordinated fire line (CFL), fire support coordination line, restrictive fire line (RFL), and airspace coordination areas. It has the capability to safely vector aircraft throughout its area of responsibility.

a Depending upon the geographic location of the units involved, aircraft may check in with the DASC shortly after takeoff. When the pilot advises the DASC of his mission, present position, altitude, and destination, a determination can be made as to the best route for the aircraft. Aircraft transiting a DASC's area are provided flight path vectoring information in distance and radials from a tactical air navigation (TACAN) station or in grid coordinates. Aircraft reporting to the DASC for assignment to a terminal control agency are given a safe flight path to a point at which they can be received by the terminal control agency.

b When an aircraft has a requirement to enter or transit an area in which there is artillery firing and/or naval gunfire, the DASC determines if it is feasible to vector the aircraft around, over, or under the firing. If a safe vector is not posible, the DASC notifies the FSCC of the aircraft's mission, position, altitude, and destination and requests a "check fire" on the artillery/naval gunfire mission which would present a hazard to the aircraft. The DASC notifies the FSCC immediately when the area is clear of aircraft to permit resumption of firing. To facilitate the fire support coordination process, the DASC keeps the FSCC informed of planned tracks or routes of aircraft; e.g., reconnaissance aircraft. This information includes the coordinates of the track or route, the mission and altitude of the flight, and the inclusive time that the flight will be in the area. This permits the FSCC to anticipate and more efficiently plan fire support coordination requirements.

(b) Terminal Control.--The conduct of terminal control is dependent upon the type mission and type of control agency involved. The principal terminal control agencies for offensive air support are the TAC(A), AFAC, FAC, and ASRT. In most cases, positioning of aircraft for handover to a terminal control agency is accomplished by the DASC. In the case of the ASRT, a radar handover by the TAOC is common. Once aircraft have been handed over to a terminal control agency, primary responsibility for the safety of the aircraft and coordination with other aircraft and supporting arms rests with this terminal control agency. However, significant assistance is given these agencies by other MACCS agencies. For example, an ASRT close support bombing control mission may be simultaneously given flight following by the TAOC; the DASC ensures that no aircraft are vectored into an area in which a TAC(A) or FAC is controlling a CAS mission.

1 TAC(A)/AFAC.--Upon receipt of aircraft for control, the TAC(A)/AFAC establishes identification and assigns an orbit point. Usually, the orbit altitude is not assigned unless the presence of other flights require altitude assignment in a "stack." Under these conditions, the TAC(A)/AC anticipates each mission and calls the next flight down to working altitude shortly before it is needed. During the conduct of a series of strikes, the TAC(A)/AFAC maintains a continuing bomb damage assessment (BDA) and passes it to the attack pilots upon mission completion. Should time not allow, the BDA is passed directly to the DASC after departure of the strike aircraft. The TAC(A)/AFAC clears each flight onto the target and advises the pilots of other aircraft near the flight path or enemy fire directed at the striking aircraft. From his position of being able to observe strike aircraft runs, the target area, and friendly forces, the TAC(A)/AFAC advises both aircraft and ground units of useful information which might influence or enhance the immediate tactical situation. Additional information of which the TAC(A)/AFAC advises strike aircraft is:

a Weather, cloud cover, visibility, wind direction, and velocity.

b General nature of anticipated targets.

c Type of enemy ground fire anticipated.

d Time factors and special ordnance information.

e General nature of the terrain, elevation of the target area, highest elevation in proximity to the target.

f The closest air control agency to provide penetration and departure routes, if weather is unfavorable.

g Information concerning present friendly positions in the target area.

2 FAC.--The FAC is briefed by the DASC on the position and altitude of arriving strike aircraft. Upon initial contact with the flight, the FAC briefs the aircraft in a similar manner as a TAC(A) brief. The aircraft are cleared into the ground unit's airspace where the FAC establishes visual contact and assigns an orbit point. At this time, the

process of identifying and marking the target commences. Whenever possible, aircraft run-in headings will parallel friendly force positions, and the FAC establishes these general flight paths as the aircraft orbit. Panels, smoke, and marking rounds are employed to indicate both friendly and target positions. In instances of light ground fire, the FAC may direct aircraft "dummy runs" to identify the target more definitely. The aircraft are cleared onto the target and ordnance is dropped according to the desired sequence. "No-drop" reports are made to the FAC by the aircraft to ensure accurate assessment and to assist the locating of duds. Aircrews and the FAC exchange observed BDA to offset aerial and ground only evaluations and to produce the most comprehensive assessment. Upon completion of the strike, aircraft are cleared out of the area while the FAC notifies the DASC and the appropriate FSCC to permit resumption of other supporting arms activity.

(c) En Route Control From Terminal Control.--En route control of aircraft that have completed work with a terminal control agency is most frequently a reverse application of the process of en route control to their terminal control agency. For example, an aircraft that has received en route control and a radar handoff by a TAOC to an ASRT may receive en route control by the TAOC upon completion of the ASRT mission. This control similarly involves the coordination of the aircraft flight path with other airspace utilization activity. Aircraft control may involve transiting airspace being utilized by other offensive air support aircraft, other fire support means, and other aviation activity, such as air defense or air reconnaissance.

(6) ASRT Operational Characteristics.--The ASRT utilizes a ground based, close support bombing control system which consists of a precision tracking radar and associated computer equipment designed to accurately position aircraft without visual reference to the earth's surface. There are two methods of aircraft control: the voice vector or manual method and the automatic method. In the voice vector method, the ASRT strike controller passes course, altitude, speed, and drop commands to the pilot by ground-to-air radio. In the automatic method, course and drop commands are transmitted to the aircraft by radio data link. Both methods of control may employ two modes of operation: the radar skin track mode or the beacon mode. The radar skin track mode relies on normal radar return and is the more limited in range of the two. The beacon mode involves the utilization of a transponder in the aircraft which is triggered by the transmitted signal from the ASRT's radar course directing central. The transponder, in turn, transmits a signal stronger than what the reflected radar signal in the radar skin track mode would be. This significantly increases the range at which the system can maintain a "lock" on the aircraft and, consequently, the range at which close support bombing control can be conducted.

(7) ASRT Emplacement.--The ASRT is one of the major radar systems used in offensive air support.

(a) Emplacement Considerations.--Emplacement considerations for the ASRT are of both a technical and tactical nature and include the following:

1 Technical.--The technical consideratons for ASRT emplacement are:

a The amount of masking of the radar beam expected from surrounding terrain.

b The proximity of artillery or other equipment which could result in severe concussions or electronic interference with the radar and/or communication equipment.

c The capacity of the site to physically accept the radar subsystem, computer subsystem, communication equipment, generators, and ancillary equipment.

2 Tactical.--The following tactical considerations apply:

a Suitability of the location to adequately provide system coverage of the assigned area of operations.

b Overlap and/or backup area coverage with adjacent ASRT's may be required.

c Distance from the associated DASC may require special measures for the exchange of operational information; e.g., communication measures.

d Accessability of the site for supporting elements to provide logistical and other support.

e Security of the site must be provided.

(b) Emplacement Requirements.--When a proposed site is determined to be tactically and technically adequate, the ASRT survey team is employed to survey the position for the RCDC system. The length of time required to complete the site survey will vary according to the accuracy and availability of existing maps, accessibility to readily identifiable landmarks, etc. The survey, absolutely essential to the establishment of the ASRT, can normally be completed in a relatively short period of time.

(8) ASRT Employment.--Three ASRT's are organic to each MASS. The ASRT is under the operational control and direction of the DASC. All ASRT missions are assigned and coordinated through the DASC. Under the cognizance of the TACC/TADC, the DASC assigns hours of operation to each ASRT which permit the necessary time for maintenance and/or displacement. The TACC/TADC, TAOC, and FSCC are kept advised of the operational status of each ASRT. In addition to its primary mission of close support bombing control, the ASRT may perform other tasks such as paradrops, flare drops, loft bombing, air-to-surface missile delivery, and precision positioning for air reconnaissance. The ASRT is also capable of positioning helicopters over landing zones and providing a limited radar letdown to aircraft.

(a) The ASRT targets are provided to the DASC by the FSCC. The targets are plotted on the DASC's air situation board and are verified for accuracy and completeness by the DASC's SAD. This is one in a series of steps designed to check and recheck target information.

(b) Strikes controlled by the ASRT may be preplanned, immediate, or divert missions. In most instances, immediate and divert missions are directed against observed targets of opportunity or sudden troop contact with enemy units. In some instances, it may be desirable to adjust ASRT drops by a TAC(A)/AFAC, FAC, reconnaissance team, etc. This is accomplished by having the ASRT control an initial strike with only a portion of the aircraft's ordnance to determine accuracy. The observer then provides adjustment information which is furnished the ASRT until desired accuracy is achieved.

(c) The TAOC provides a radar handover of aircraft scheduled to work with the ASRT. The radar handover point is determined by the DASC in conjunction with the TAOC and ASRT and is dependent upon airspace coordination areas, air traffic control requirements, and other tactical considerations.

(d) In order to provide the most accurate bombing possible, the ASRT must possess exact information on target coordinates, aircraft ordnance loads, and ordnance ballistics data. Due to the requirement for accurate ballistics data, normally only "hard" or nonretarded ordnance is employed for ASRT missions.

(9) Conduct of ASRT Missions.--The DASC provides the ASRT's with a schedule of air support missions and specific mission requirements. Once the target and mission data are received, the close support bombing mission is conducted in two phases: preparation and execution.

(a) Preparation.--Whenever possible, the DASC provides the ASRT with a copy of the list of ASRT targets received from the FSCC. When the location of the ASRT precludes the use of a written list, the target data is passed by the DASC by radio, multichannel radio, wire, or other communication means. Targets are plotted by the strike controller or radar operator on the ASRT situation map. Targets which appear to be in a nontarget area or which appear to hazard friendly forces or populated areas are confirmed with the DASC. The fact that targets received by the ASRT are certified as being cleared by appropriate agencies does not mitigate the responsibility of ASRT personnel to meticulously check plotted targets. Two strike controllers or a strike controller and a radar operator separately sight, record, and process the target data. The process requires each to individually obtain the necessary insert data, separately compute the problem, and compare solutions. Once verified, the computer inserts are entered in the prescribed sequence, checked by the radar operator, and read back to the controller. Safety requires the sequence or check to be reinitiated if interrupted.

(b) Execution.--Normally, the TAOC provides a radar handover of strike aircraft to the ASRT and provides radar surveillance during the ASRT run. If a radar handover is not available, the pilot reports his TACAN position to the ASRT until positive radar lock is established.

1 Upon establishment of radio contact, the pilot provides the ASRT with:

a Call sign.

b Mission number.

c Number and type aircraft.

d Amount and type of ordnance, including fin and fuze type.

e Position (in TACAN range and azimuth or range and bearing from landmark or known point).

f Altitude (to nearest 1,000 feet).

g Aircraft configuration for use of ground controlled bombing system (automatic mode) and/or control beacon (beacon mode).

h Time to BINGO.

2 After the aircraft report in, the strike controller may be required to give certain information, such as assigned heading and altitude, in a secure manner. A common method is to designate a classified "base" heading and altitude and to give heading and altitude instructions relative to that "base." The strike controller will:

a Advise the pilot(s) regarding radar contact.

b Vector to attack heading, or give instructions to proceed to orbit point at a specified altitude if there is no radar contact.

c Give attack altitude.

d Give attack true air speed.

e Give command link channel and code (automatic control only).

f Give beacon code if aircraft is equipped with control beacon.

g Give number of runs and ordnance to be delivered on each run.

h Give lost communication procedures.

3 During voice vector runs, after the aircraft has commenced the final attack heading, precise course, speed, and altitude corrections are required from the controller. In the final stages of a run, course and/or altitude changes will result in the aircraft having a lateral velocity and/or a climb or descent rate at the time of bomb release. This will cause greater error than if a slightly off course, but steady, or slightly off altitude, but steady, situation exists.

(10) Mission Assessment.--Upon completion of offensive air support missions, pilots report mission results to the DASC. Mission reports on ASRT controlled aircraft are made by the ASRT to the DASC. All terminal control agencies report mission completion to the DASC as they release aircraft. The DASC consolidates mission assessments and forwards reports to the TACC/TADC and FSCC as required.

(a) Aircraft.--CAS aircraft report mission results, including ordnance expended and BDA. Aircraft are released for return to base if fuel and ordnance status preclude other mission assignments. Fuel and ordnance permitting, aircraft are utilized on another mission or assigned to an orbit point to hold for possible employment. Aircraft such as air reconnaissance flights also report mission completion to the DASC as required.

(b) Terminal Control Agencies.--Terminal control agencies report mission completion and BDA to the DASC. Mission completion reports are essential to allow the DASC to effectively manage its assets and are required from each terminal control agency. Damage assessment may be reported through aircraft, but will be separately submitted whenever possible. Modifications may be forthcoming from FAC's, AFAC's, and TAC(A)'s on damage assessments which were unknown at the time of completion of the strike. Terminal control agencies will provide strike aircraft and the DASC with the following items of damage assessment:

1 Target coordinates.

2 Time on and off target.

3 Percent of hits on target and percent of target covered.

4 Damage.

a Structures destroyed or damaged.

b Enemy casualties killed and confirmed.

c Vehicles (land or waterborne) damaged or destroyed.

d Weapons or radar positions damaged or destroyed.

e Bridges or roads/trails damaged or destroyed.

f Supply caches (by type) damaged or destroyed.

g Area coverage.

h General effect on target.

i Unit supported.

j Operation supported.

e. Armed Reconnaissance.--As the amphibious assault progresses, the demand for offensive air support increases. The enemy is fully aware of the objective area and will increase his efforts to resupply and reinforce defensive positions. Marine aviation is fully capable of monitoring lines of communication day and night. The moving target indicator (MTI) of the A-6 aircraft and the side-looking radar (SLAR) of the RF-4 allow the observation of roads or highways regardless of visibility. During daylight and when weather permits, A-4, TA-4, AV-8, F-4, and OV-10 aircraft may all participate in the reconnaissance of assigned sectors. When targets such as truck convoys, armored columns, antiaircraft artillery sites, or artillery positions are discovered, the reconnaissance aircraft may attack and/or call in additional strike aircraft with appropriate ordnance aboard. Armed reconnaissance should not be confused with interdiction where a sector is assigned with selected targets such as bridges, road intersections, railroad junctions or trestles, and truck parks. Whereas interdiction is performed to deny the enemy access to the objective area, armed reconnaissance is performed to seek out and destroy the enemy.

f. Antimechanized Support.--The best method of countering the enemy's armor threat is to prevent it from getting to the main battle area. As tanks reach greater levels of sophistication, so do the weapons designed to defeat them. The tube launched, optically tracked, wire command link guided (TOW) missile and other tanks can make the battle area quite ferocious for enemy armor, but antitank measures by the ground units would not be required if enemy armor was stopped en route. Because tanks with sufficient maneuvering room are a difficult target for high performance aircraft, it is desirable to engage them in areas where maneuverability is restricted, such as bridges, canyons, highways, or vehicle parks. Rockets, cannons, and especially armor piercing cluster bombs, such as the Rockeye, are effective against armor. Although direct hits depend upon the circular error of probability of the pilot, aircraft, and weapon, even near misses may break antennaes, clog strainers, or air intakes, and damage the track mechanism. Armor that has its maneuverability restricted, communications cut off, or mobility curtailed is temporarily less effective and more vulnerable to further ground or air attack. If enemy armor does reach the main battle area, air, friendly armor, artillery, antitank missiles, and infantry must combine efforts to neutralize or destroy the threat. If the enemy attacks at night, the antitank missiles can be very effective when flares are dropped behind enemy tanks, providing a good target profile. Under any conditions, when attacking a large number of tanks, an extremely heavy volume of AAA fire, including SAM's, should be anticipated from the enemy armor and supporting arms. Infantry and artillery must combine their efforts to neutralize the enemy air defenses. The enemy air defense umbrella must be eliminated before air support can effectively combat enemy armor.

3405. POSTASSAULT PHASE OPERATIONS

a. Postassault operations commence when the amphibious operation has been terminated. LFM 01, Doctrine for Amphibious Operations, sets the following guidelines for this determination:

(1) The force beachhead has been secured.

(2) Sufficient tactical and supporting forces have been established ashore to ensure the continuous landing of troops and material requisite for subsequent operations.

(3) Command, communications, and supporting arms coordination facilities have been established ashore.

(4) The commander landing force has stated that he is ready to assume full responsibility for subsequent operations.

b. When these conditions have been met, the CLF and CATF will forward a recommendation to the designated higher authority to terminate the amphibious operation. Once the amphibious operation has been terminated, and the ATF dissolved, the CLF will commence postassault phase operations.

c. Upon the termination of the amphibious operation, elements of, or the entire landing force, may be required to remain ashore as an MAGTF and engage in what is essentially land combat. Once established ashore, and upon the termination of the amphibious operation, the MAGTF, as an organization of balanced arms, has the capability to conduct sustained operations. It is essential that in postassault operations the CLF, as the commander, continues to exercise command over both the ground and aviation units.

d. The tasks performed by Marine aviation during the postassault phase will be similar to those performed during the assault phase. The attack and fighter attack aircraft will continue to maintain air superiority and support the ground forces. Postassault phase operations may include additional objectives to be seized by the forces established ashore or maintaining the beachhead line drawn at the time the amphibious assault is terminated. In either case, offensive air support will be a continuation of previous operations. Airfields should be operational within the AOA which will facilitate better response to the ground commanders' CAS requests. Deep air support missions, especially interdiction, will be performed on a continuous basis. Since it may not be feasible to base all aircraft within the AOA, priorities must be established concerning their desired location. In most cases, the capabilities of the aircraft will determine where they should be based. The A-6 would not have to be based near the FEBA because of its long-range and deep air support capabilities. The AV-8, however, has less range, requires little or no runway, and is highly effective in the quick response, CAS role. It would, therefore, be desirable to base the AV-8 within the AOA. If postassault phase operations are expected to continue for a prolonged period, it would be more economical to eventually locate all of landing force aviation within the AOA.

e. Marine aviation, while an element of the MAGTF, is able to integrate with other Service components that are present in the area where combat operations are being conducted. Close coordination between the Marine air commander and the commanders of aviation elements of the other Services, particularly the Air Force component commander, is required. Although this coordination will exist and Marine aviation might even be called upon for some support outside the MAGTF, such support will be with the approval of the MAGTF commander. Also, if the MAGTF commander requires additional support beyond the capabilities of Marine air, he may request coordination and/or support from other service components. Normally, in either case, the MAGTF will be a component of a joint or unified command and perform tasks assigned by a higher authority.

Section V. LOGISTIC SUPPORT CONSIDERATIONS

3501. GENERAL

a. The establishment of Marine aviation ashore poses a major logistic problem involving:

(1) The movement of heavy and complex equipment and combat aircraft by surface and air.

(2) The installation of dispersed facilities, often in relatively underdeveloped areas, which requires an extensive engineer effort.

(3) The movement of great quantities of supplies; principally, fuel, spare parts, and aircraft munitions.

b. When established ashore, units of the Marine aviation element are dispersed over a wide area, perhaps as much as several hundred square miles. Included in this area of operations are a complex of airfields, VTOL and helicopter operating sites, radio and radar installations, antiaircraft missile battalions, command and control agencies, and maintenance and supply facilities. The construction of airfields and the installation of supporting activities will require engineering support which cannot be provided by units organic to Marine aviation.

c. Marine aviation is capable of operating air facilities; maintaining, servicing, and arming assigned aircraft; and storing and handling supplies at the airfields. Construction and repair of operating facilities and distribution of aviation fuel and ordnance from ships to airbases are logistic operations beyond the capabilities of Marine aviation and require external support. This support entails a logistic effort of considerable magnitude. The aviation logistic system must be capable of incremental introduction of supply and support into the objective area at a rate consistent with the tactical situation. A typical phasing ashore will progress from austere operations and logistic requirements to full group/wing sustained operations. The Marine aviation support system, therefore, must be flexible, mobile, and responsive.

3502. SUPPLY AND MAINTENANCE

a. Organization for Supply

(1) The squadron materiel section provides assistance to squadron maintenance personnel in obtaining repair parts. It stores allowance list materiel not being used and maintains a limited amount of high turnover repair parts for support of aircraft.

(2) The supply section of the MAG or independent squadron is responsible for requisition receipt, storage, issue, and accounting for classes I, II, IV, V(A), VI, VII(A), and IX(A) material. Classes III, III(A), and V(A) do not come within the purview of the supply organization of Marine aviation units.

(3) Operating levels of supply held by the supply section of MAG's and independent squadrons are generally as follows:

(a) Classes I, IV, V(A), VI, VIII .... (As directed)

(b) Classes II, IX .... (As directed by cognizant force commanders)

(c) Classes VII(A), IX(A) .... 90 days

b. Supply of Aviation Fuel

(1) Governing Factors.--Aircraft consumption rates and fuel types are the primary governing factors in determining fuel tonnage and volume requirements. Consumption rates vary from 600 to 5,000 pounds per hour, depending upon the aircraft. Total class III(A) requirements for operation of a Marine aircraft wing may exceed 400,000 gallons per day.

(2) Tactical Airfield Fuel Dispensing System.--The engineer squadron of the Marine Corps support group has the mission of providing TAFDS services to the MAW. This includes the task of storage, operation, and training. The basic TAFDS has a capacity of 60,000 gallons.

(3) Fuel Delivery to TAFDS.--The engineer squadron, MWSG is dependent upon other service forces for delivery of fuel to the TAFDS site. In the amphibious assault, naval forces deliver the fuel to the beaches or ports. The force service support group distributes it to the operational units, initially in packaged containers. The delivery in containers is an interim measure, pending activation of an amphibous assault fuel system (AAFS), or the installation of a pipeline.

(4) Amphibious Assault Fuel System.--For support of sustained air operations ashore, it is preferable that the aviation fuel be transferred from the beach, port, or barge unloading points by pipeline to the receiver or interconnected into the AAFS of the landing force. A single AAFS has a storage capability of 600,000 gallons of fuel as well as the transfer pumps, hoses, and collapsible tanks to transfer fuel a distance of 3 miles. Only one type of fuel can be handled in each AAFS system at a time. A single AAFS can be divided into smaller units or subgroups to permit it to handle reduced quantities of several types of fuel, if desired. The maximum distance obtainable through use of multiple AAFS is 24 miles under favorable terrain conditions. Due to normal allocation of available amphibious assault fuel systems for handling different types of fuel at various locations, limitations imposed by terrain and requirements for local security, fuel transfer is generally limited to 3 to 6 miles. A 600,000-gallon system can be installed by a bulk fuel platoon in approximately 48 hours. Dependent upon the availability of service and engineer support, as well as the distance inland to operating bases and airfields, several day's installation time is generally involved.

c. Aviation Ordnance Supply

(1) Like aviation fuel, the expenditure of class V(A) supplies is geared to the tempo of operations. It is proportionate to the sortie rate and to the type of mission. An interceptor mission, for instance, expends less class V(A) tonnage than a close air support mission by attack aircraft. For planning purposes, class V(A) requirements are expressed in days of ammunition. A day of ammunition is further defined as weapons

loads. A weapons load represents the average number of weapons per aircraft per sortie per day. Factors used to compute days of expenditures by aviation units in combat operations and requirements generated by the Navy and Marine Ordnance Requirements Model (NAVMOR) which determines weapons effectiveness, sortie allocations, and weapons mix. The prescribed days of ammunition/weapons loads/mix do not preclude the commander landing force or the landing force aviation commander from altering the stated requirements in terms of the specific tactical situation.

(2) The initial supply of class V(A) is landed with each force service support group (FSSG) in support of the aircraft wing/group and stored at ammunition supply points (ASP's). The H&MS munitions section will move the munitions from the ASP to the munitions buildup area. Resupply of munitions of the ASP is the responsibility of the force service support group.

(3) Nuclear munitions for those units of the MAW to be established ashore present a relatively small logistic problem in terms of tonnage. The Marine wing weapons unit and the munitions may be embarked in assault shipping and landed early in the operation, or the MWWU and the munitions may be brought into the area by fixed-wing transport from bases outside the objective area, if an adequate air facility is in operation. Continuing supply of air-delivered nuclear munitions in the ready condition can be accomplished by air transport. From the standpoint of storage and handling, air delivery is the preferred method of landing such munitions.

d. Aviation Maintenance

(1) The combat capability of Marine squadrons depends, in a large measure, on the maintenance of their aircraft in combat ready condition.

(2) The various levels of aircraft maintenance which affect Marine aviation are defined as:

(a) Organizational Maintenance.--That maintenance performed by the operating unit on a day-to-day basis. Organizational maintenance includes line operations (servicing, daily/preflight inspections, minor adjustments, etc., in preparation for flight), periodic inspections of aircraft and equipment, and the associated tests, repairs, and adjustments which do not require shop facilities. All such work is done in facilities assigned to the operating units on either a joint or individual basis.

(b) Intermediate Maintenance.--That maintenance which is the responsibility of and performed by designated maintenance activities for direct support of using organizations. It normally consists of:

1 Calibration, repair, or replacement of damaged or unserviceable parts, components, or assemblies.

2 Emergency manufacture of unavailable parts.

3 Providing technical assistance to using organizations.

(c) Depot Maintenance.--That type of maintenance which is performed in an industrial type facility. Such facilities may be either military or commercial. Depot maintenance includes overhaul and major repair and modification of aircraft, components, and equipment. It also includes the manufacture of designated aeronautical parts as system spares and the manufacture of kits for the accomplishment of aircraft and equipment modifications. Support is servicewide.

(d) Squadron Level Maintenance.--It is impractical to man and equip each tactical squadron to perform all levels of aircraft maintenance; therefore, aircraft squadrons have a relatively limited aircraft maintenance capability. The period of time during which they can maintain an effective level of aircraft availability is dependent upon the logistic support provided. Squadrons supplied with adequate aircraft, spare parts, fuel, ammunition, liquid oxygen, and certain electronics test equipment can operate for extended periods.

1 Squadrons are limited to the use of hand tools for the repair of aircraft damage. They can remove and replace armament, but cannot repair, service, or test it. They normally carry the necessary tools and equipment to remove and install engines. They are able to tune and test aircraft electronics components using portable test equipment which includes frequency setting and "go-no-go" instruments only. Further testing, when required, will be conducted by the H&MS.

2 The equipment necessary to maintain and service the aircraft, plus a small supply of high usage spare parts, comprise the bulk of the class II(A) and class IX(A) equipment and supplies required to operate a squadron.

3 The squadron aircraft maintenance section, with its equipment, is embarked with the surface echelon in either assault shipping or followup shipping and normally lands after general unloading commences. It is desirable to have this element of the squadron landed and in position prior to the arrival of the squadron in the objective area. Normally, the ground elements of the fixed-wing squadrons are landed by waterborne landing craft. However, the majority of the equipment is helicopter transportable and this method of landing may be employed.

(e) Group-Level Maintenance.--Group-level intermediate maintenance is performed by the H&MS. This squadron can repair, service, and test aircraft armaments and has facilities to perform engine buildup. Group-level maintenance can remove and replace aircraft electrical wiring and cabling and has equipment for the detailed bench test and repair of certain aircraft electrical components. In the event that the MAG is to be deployed independently from normal wing maintenance and supply support, aeronautical material and equipment allowances must be specifically designed to support the deployment. Personnel and equipment, to provide the group-level maintenance capability, are embarked with the surface echelon of the group in either assault or followup shipping, depending upon the time schedule for establishing the units of the Marine aircraft wing ashore. Elements of the group headquarters and maintenance squadron are not usually landed during the first several days of the operation. Operating conditions in the objective area influence the time of landing and, consequently, the establishment of group-level maintenance facilities ashore.

1 Aircraft Maintenance Section, H&MS.--The aircraft maintenance section of an H&MS of a typical fighter/attack group includes a much larger percentage of skilled technicians among the personnel assigned than does the aircraft maintenance section of the tactical squadron.

2 Supply Section, H&MS.--A companion section of the group headquarters and maintenance squadron, which must be landed and in operation before complete group-level maintenance can be provided to support the tactical squadrons, is the group supply section. This section provides aircraft spare parts and consumable aeronautical supplies which are necessary for group-level maintenance of aircraft. The group supply section also supports the squadrons with aircraft spares. The class II and IX(A) equipment and supplies of the headquarters and maintenance squadron of the fighter/attack group are considerably more bulky than those of the tactical squadrons, totaling about 700 short tons. The figure includes the supply of aircraft spare parts and consumable items carried by the group supply section. The normal supply allowances for aircraft squadrons, authorized by the Naval Air Systems Command, are based upon requirements for 90 days of operations under combat conditions. The group supply section carries these supplies for all squadrons assigned to the group.

f. Air Support and Air Control Squadrons.--In the event a Marine air support or air control squadron is deployed independently from normal wing maintenance and supply support, Marine Corps furnished electronics material and equipment allowances are specifically designed to support the deployment. Normally, if the independent operation involves proximity or attachment to Marine division elements, force service support group will provide direct logistic and maintenance support.

3503. ENGINEERING REQUIREMENTS

The Marine aircraft wing is largely dependent upon engineer support by other forces for base construction, repair, and development. This support is normally supplied in amphibious operations by force engineers and/or naval mobile construction battalions (MCB's). Each type unit of the wing represents a different engineering problem with respect to base requirements. The following paragraphs describe engineering requirements for various types of aviation facilities and the wing engineer capabilities:

a. Airfields for High Performance Aircraft.--Normally, it takes from 5 to 7 days to establish high performance aircraft units on existing airfields within the objective area. The arresting gear installation, the shore-based catapult, and operational aircraft takeoff characteristics diminish the construction requirements to prepare airfields to jet aircraft operation. Fields which are otherwise too short or are partially damaged can be made usable by this method. Taxiways, undamaged parts of runways, or even flat stretches of good highway can serve as a temporary field for high performance aircraft. When fields must be constructed, the shortened runway reduces engineer effort by about two-thirds. In order to establish and rapidly develop air facilities for high performance aircraft, logistic planning includes the necessary preparatory measures to be accomplished concurrently with the conduct of air operations aboard carriers and/or remote airfields. A systematic plan for installation, occupation, and development of air facilities ashore is necessary if a reasonable time schedule is to be attained. Modern jet aircraft require runway surfaces which withstand landing loads of 400 psi and which are 8,000 to 10,000 feet in length to provide for rollout after landing. Runways for modern military jet aircraft must be constructed of reinforced concrete or aluminum matting. Pierced steel planking as used in the past will neither withstand the wheel loads nor the blast from the jet engines. V/STOL aircraft basing flexibility offers significant advantages over those factors listed above. See section VII for an explanation of these advantages.

b. Wing Engineer Organization

(1) The wing engineer squadron, Marine wing support group, Marine aircraft wing, FMF is the primary organization which provides the integral engineer support requirements of the Marine aircraft wing. The squadron consists of a headquarters section, engineer section, utilities section, and a tactical airfield fuel dispensing system section. The headquarters section consists of a command, control, and administrative element necessary to support, coordinate, and supervise the operations of the squadron. The engineer sections consist of a headquarters unit, a support unit, and engineer units to provide the essential engineer construction support of the MAW and assigned units. The full strength number of engineer units within the engineer section table of organization (T/O) is six, but may be adjusted dependent upon the task organization of the MAW to which assigned. One engineer unit is provided for support of each tactical Marine aircraft group with an additional unit assigned to provide engineer support for wing support/headquarters units and air control groups. Accordingly, the engineer unit is the basic engineer support unit of the engineer squadron and is, therefore, the nucleus for structuring the engineer support organization of the wing. The engineer unit, with appropriate augmentation from the headquarters engineer section and other sections of the squadron is capable of being task organized to support deployed MAG's. Depending upon the deployment distance and duration, the engineer unit may be retained in general support or assigned to direct support of the MAG. The utilities section consists of a headquarters unit, three mobile electric power units, and three environmental control units and provides the essential water, hygiene (bath, laundry, decontamination, and fumigation facilities), electric power, refrigeration equipment, and personnel in support of MAW operations. The utilities section is organized, but not limited to, supporting MAW operations from three primary locations. In those instances in which centralized control by the engineer squadron is not practical, elements of the utilities section will augment the engineer unit supporting the wing unit/group operations. The tactical airfield fuel dispensing system section consists of a headquarters unit and TAFDS unit to provide expentionary class III and class III(A) storage and dispensing support for wing units at tactical airfields. The number of TAFDS units within the TAFDS section, normally five, is dependent upon the task organization of the MAW to which assigned. One TAFDS unit is provided for each aircraft group. The number of TAFDS units within an individual MWSG may be adjusted, dependent on the task organization of the MAW to which assigned. In those instances in which centralized control by the engineer squadron is not practical, elements of the TAFDS section will augment the engineer unit supporting the wing unit/group operations to meet the class III/III(A) requirements.

(2) In accomplishing the mission of increasing the combat effectiveness of the Marine aircraft wing by providing direct engineer support to the MAW. This includes the construction, improvement, and maintenance of helicopter and light reconnaissance aircraft landing sites, TAFDS support, and the provision of essential utilities (potable water, bath, and laundry facilities) and electrical power. The squadron is task organized to provide one engineer unit for the MAW headquarters elements and ground control group and for augmentation/contingency purposes, respectively. Operations of those units supporting deployed elements of the MAW will generally be decentralized. Engineer support requirements to the rear of forward/deployed elements will be performed under the centralized control of the engineer

squadron. The primary source of engineer support augmentation in the form of personnel and specialized engineer equipment is provided from the internal resources of the squadron; i.e., the support unit of the engineer section, the utilities section, and the TAFDS section. External augmentation may be provided by the engineer battalion, FSSG or naval construction forces (mobile construction battalion) to meet specific engineer requirements that exceed the capabilities or resources of the engineer squadron.

(3) The organization and equipment of the engineer squadron is based upon the following criteria:

(a) The consolidation of numerous small elements organic to the MAW that previously provided engineer type support into a functionally organized squadron with enhanced capability and the subsequent elimination of decentralized engineer assets.

(b) The construction and equipment support requirements normally will be limited to essentials, expedient in nature and designed to minimum standards to meet tactical aircraft requirements.

(c) The requirement to provide utilities support in the area of mobile electric power, and water and hygiene support in the area of potable water, bath, and laundry facilities.

(4) The following specific functions are considered to be both a responsibility and a capability of the engineer squadron:

(a) Provide engineer reconnaissance/survey within the landing force zone of action.

(b) Repair, improve, and maintain existing road nets within the MAW/MAG's area of responsibility.

(c) Construct and maintain expedient roads.

(d) Construct, improve, and maintain helicopter and light reconnaissance aircraft landing sites to meet minimum wing requirements.

(e) Provide first echelon level maintenance of all organic equipment.

(f) Construct temporary camps to include the provision of technical and equipment assistance for the erection of shelters.

(g) Provide essential utilities support in the area of electrical power.

(h) Provide essential water and hygiene support in the area of potable water, bath, and laundry facilities.

(i) Repair existing warehouses and facilities.

(j) Develop, improve, and maintain drainage systems.

(k) Provide survey and drafting support as required.

(l) Supervise special camouflage tasks.

(m) Provide expeditionary class III/III(A) storage and dispensing support.

(n) Locate quarries, sand and gravel pits, and other sources of construction material in the objective area.

(o) Construct turnouts and parking areas.

(p) Provide expedient repair of existing airfield runways/ taxiways.

(q) Provide minor repair and maintenance within organizational capability to airfield runways and taxiways.

3504. EXPEDITIONARY FACILITIES

As Marine aviation evolved into all jet tactical air units during the 1950's it became apparent to the planners that many of the airfields throughout the world which had been counted on in our contingency planning would not be adequate for fixed-wing jet aircraft. These significantly heavier and faster aircraft required stronger and longer runways than their propeller driven forerunners. Such runways are not common to many of our potential engagement areas. Planners additionally recognized that even where a airfield was available, a second or alternate airstrip would often be needed in a combat environment. Aircraft carriers constituted one answer, provided that a carrier would be readily available whenever an FMF employment situation occurred. Weighing carrier assets against existing and potential demands, the planners decided that the Marine Corps could not rely solely upon carrier decks. The time needed to construct a normal airfield (6 to 8 months minimum) ruled out that alternative. A requirement existed to bypass normal airfield construction methods of grading and pouring an 8,000-foot runway. It was decided to develop a prefabricated and fully portable airfield which could be transported to any given "hot spot" and quickly assembled to launch and recover any of our high performance jets. The development which followed resulted in the expeditionary airfield concept (formerly SATS concept).

a. Expeditionary Airfield Concept.--The EAF is a shore-based weapons support system which permits the employment of landing force aircraft within effective range of ground forces. It has the ability to launch and recover helicopters, V/STOL, and high performance tactical jet aircraft while supporting and maintaining up to one task-organized Marine VF/VA aircraft group, or a mixture of fixed- and rotary-wing aircraft under all-weather conditions. The EAF building block concept starts with the 72-foot by 72-foot expeditionary operating sites, progresses to the 72-foot by 600-foot expeditionary facilities to accommodate VTOL/V/STOL operations, then to the 72-foot by 1,800-foot expeditionary airbase to accommodate up to 36 helicopter and V/STOL aircraft. One expeditionary airfield, 96 feet x 5,184 feet, per aircraft wing will accommodate approximately 88 fixed-wing aircraft or a mix of helicopter/V/STOL and fixed-wing. Lastly, the concept envisions prepositioned war reserve assets for one strategic expeditionary landing field (SELF), 96 feet by 8,000 feet, with parking and taxiways to accommodate the same aircraft as the expeditionary airfield plus military airlift and/or the civilian reserve air fleet. Expansion of the EAF concept from the forward operating sites through the various building block configurations will be dictated by operational requirements, site conditions, and the availability of existing airfields in the theater of operations.

Each of the configurations would consist of AM-2 aluminum matting runway/pad and taxiways plus aluminum matting parking/hides. The concept packages also contain lighting, arresting gear, and other equipment/components to provide for all-weather operations as the conditions dictate. Many factors will influence the time and effort required to install an EAF or other aviation facility, such as site characteristics, number and type of aircraft to be supported, projected duration of operations, availability of local materials, and weather conditions. Figure 23 shows a possible EAF configuration.

b. Expeditionary Airfield (96 Feet by 5,184 Feet).--The EAF is the primary fixed-wing facility in the expeditionary airfield building block concept. Expeditionary airfield assets are not sufficient to support Marine aviation ashore if all major units are deployed simultaneously. Thus, it is envisioned that EAF facilities will be utilized for the initial move ashore and will be augmented by the use of permanent airfields uncovered as operations progress inland.

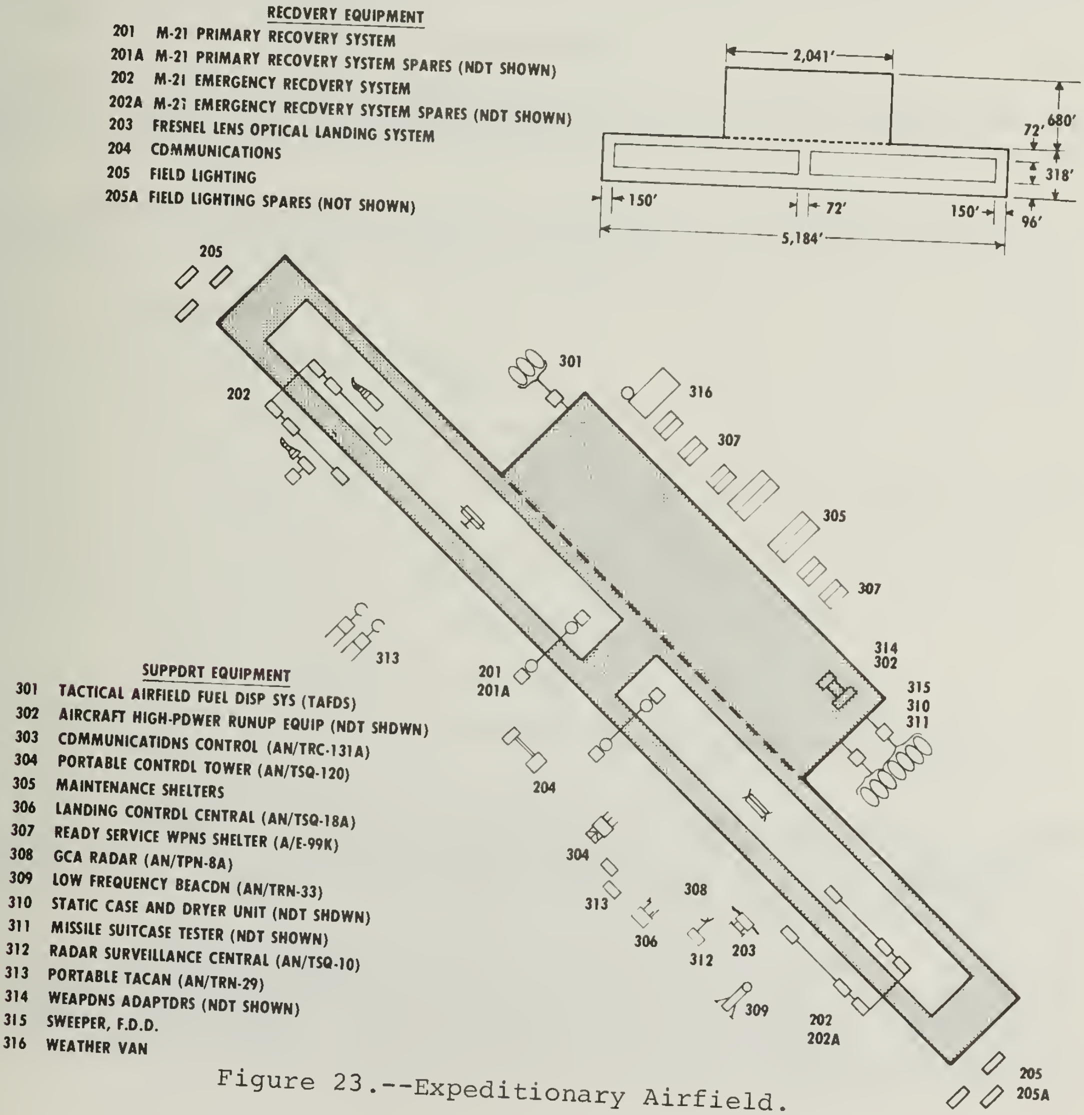

RECOVERY EQUIPMENT
201 M-21 PRIMARY RECOVERY SYSTEM
201A M-21 PRIMARY RECOVERY SYSTEM SPARES (NOT SHOWN)
202 M-21 EMERGENCY RECOVERY SYSTEM
202A M-21 EMERGENCY RECOVERY SYSTEM SPARES (NOT SHOWN)
203 FRESNEL LENS OPTICAL LANDING SYSTEM
204 COMMUNICATIONS
205 FIELD LIGHTING
205A FIELD LIGHTING SPARES (NOT SHOWN)
2,041′
680′
72′
318′
150′
72′
150′
96′
5,184′
205
202
301
316
307
305
307
313
201
201A
314
302
315
310
311
204
304
313
306
308
312
203
309
202
202A
205
205A
SUPPORT EQUIPMENT
301 TACTICAL AIRFIELD FUEL DISP SYS (TAFDS)
302 AIRCRAFT HIGH-POWER RUNUP EQUIP (NOT SHOWN)
303 COMMUNICATIONS CONTROL (AN/TRC-131A)
304 PORTABLE CONTROL TOWER (AN/TSQ-120)
305 MAINTENANCE SHELTERS
306 LANDING CONTROL CENTRAL (AN/TSQ-18A)
307 READY SERVICE WPNS SHELTER (A/E-99K)
308 GCA RADAR (AN/TPN-8A)
309 LOW FREQUENCY BEACON (AN/TRN-33)
310 STATIC CASE AND DRYER UNIT (NOT SHOWN)
311 MISSILE SUITCASE TESTER (NOT SHOWN)
312 RADAR SURVEILLANCE CENTRAL (AN/TSQ-10)
313 PORTABLE TACAN (AN/TRN-29)
314 WEAPONS ADAPTORS (NOT SHOWN)
315 SWEEPER, F.D.D.
316 WEATHER VAN

Figure 23.--Expeditionary Airfield.

c. For further information concerning the EAF and related equipment, refer to FMFM 5-1, Marine Aviation.

d. V/STOL Basing.--(See sec. VII, this chapter.)

Section VI. SPECIAL OPERATIONS

3601. GENERAL

Although Marine aviation is normally an element of an ATF, its capabilities allow employment not necessarily associated with an amphibious assault. Operations other than amphibious assaults are raids, demonsrations, and withdrawals. In addition, specialized operations, such as counterinsurgency and noncombatant evacuation are within the support capabilities of Marine aviation. In the past decade, Marine aviation has been involved in all of the operations mentioned and could be called upon again to perform a mission similar to these. It is, therefore, essential that continuous planning be in progress, to include not only amphibious operations, but all missions that are within the capability of Marine aviation. For additional information on air support in unusual environments, consult FMFM 8-1, Special Operations.

3602. OTHER TYPES OF AMPHIBIOUS OPERATIONS

Raids, demonstrations, withdrawals, and other such amphibious operations normally include both ground and air elements and may or may not be associated with an amphibious assault.

a. Amphibious Raids.--An amphibious raid is a landing from the sea on a hostile shore involving swift incursion into, or temporary occupancy of, an objective followed by a planned withdrawal.

(1) Purposes

(a) To destroy targets.

(b) To harass the enemy.

(c) To attack the enemy rear or flank in support of other forces.

(d) To obtain information.

(e) To create a diversion.

(f) To evacuate personnel.

(g) To establish, support, or coordinate unconventional warfare activities.

(2) Planning.--The plan of attack is similar to the amphibious assault; i.e., scheme of maneuver, landing plan, and plan of supporting fires, except that the scheme of maneuver must provide for withdrawal and reembarkation. See chapter 4 for additional planning considerations.

(3) Scheme of Maneuver.--In developing the scheme of maneuver, the selection of landing zones is of particular importance. The zones selected should permit easy access to the objective; however, if surprise is of paramount importance, a less suitable beach or landing zone may be chosen. Once the operation begins, the predesignated withdrawal point is

not changed unless it becomes absolutely necessary, since change at any time during the raid is confusing and could result in disaster. While a raiding force will usually reembark at the beach or landing zone at which it landed, circumstances may dictate that a different point may be designated. Landings or withdrawals may be conducted by water, air, or a combination of both.

(4) Ship-to-Shore Movement.--Landings may be during daylight or at night.

(a) Daylight.--Enemy situation permitting, movement ashore should be from as close in as possible to allow a short run to the landing beaches or zones. On the other hand, if surprise is essential, it may be that the ships will not be operated close to the shore. As always, the situation should dictate the plan of action. If supporting fires are used, the ship-to-shore movement is similar to that for a major amphibious assault.

(b) Night or Reduced Visibility.--Since a landing at night or under conditions of reduced visibility is conducted to gain surprise, preparatory fires, including airstrikes, are rarely used. Other techniques for gaining surprise are communication restrictions, late deployment of landing craft, and alternate plans for changing landing zones in the event of discovery. Consideration is also given to the possibility of landing pre-H-hour personnel in rubber boats, or single helicopters to seize immediate objectives and to cover the remainder of troops landing in other landing craft or helicopters.

(5) Offensive Air Support.--If offensive air support is desirable and feasible, it is planned in great detail. Because it may compromise the mission, offensive air is seldom employed during small sneak raids. Should the commander decide that it is needed, it may be employed as fully as in an amphibious assault. The commander landing force determines the extent to which offensive air support is necessary. To achieve surprise, he may withhold fires until after the initial landing and the objective is attacked; or he may use an airstrike to provide a shock effect, diversion, or landing zone preparation. If the objective is an offshore island, airstrikes will very likely be directed at harbors, airfields, or embarkation areas from which enemy surface or air attacks may be launched against the raiding force. The tactical air commander should anticipate a requirement for a mixture of aircraft and ordnance, airborne or ground alerts, and a minimum to significant enemy antiair threat. In any event, the commander landing force will probably use extensive air support during the withdrawal and reembarkation. The effectiveness of the supporting fires during withdrawal could very well determine whether the mission is a success or disaster.

b. Amphibious Demonstrations.--An amphibious demonstration is a show of force designed to deceive the enemy, thereby encouraging him to action or inaction which will assist the landing force. The demonstration is a feint at landing involving an approach to a beach or landing zone(s).

(1) Purpose.--To deceive the enemy concerning the time, place, or strength of the main attack, and it normally includes preparatory and supporting fires.

(2) Characteristics

(a) It does not involve the commitment of a landing force ashore.

(b) Although an actual landing of troops is not made, substantial naval and air power is employed.

(c) The forces used in the demonstration are an important consideration in the overall planning of the amphibious assault.

1 The helicopters and fixed-wing assets of an MAGTF would not normally be used in a demonstration. If they are employed for a demonstration, they would not be available for the main attack.

2 Aircraft involved in a demonstration may be part of an advanced force, and not affect the aviation element of an MAGTF.

(d) A demonstration is directed at causing the enemy to misuse his resources, thus weakening his response to the main landing. Sufficient flexibility, however, must exist in the execution of the main landing to exploit unexpected successes achieved as a result of the demonstration, planning must include provisions for them to take full advantage of any targets uncovered, opportunities to attain air superiority, or any advantage which may result from confusion on the part of the enemy.

c. Amphibious Withdrawals.--An amphibious withdrawal is a withdrawal of forces by sea in naval ships or craft from a hostile shore to preclude their loss or for their employment elsewhere.

(1) Mission.--The mission of offensive air support during an amphibious withdrawal is to provide supporting fires as a part of the covering force. This may include naval gunfire spotting, close air support, interdiction, and helicopter escort. Forward air controllers from the TACP's may control airstrikes. In the final stages of the withdrawal, this function would be performed by an AFAC or NAO. The requirement for air support increases as the withdrawing force becomes less and less capable of repelling the enemy. In essence, the supporting fires perform the same tasks as they do when covering the withdrawal phase of an amphibious raid. Once again, they are of crucial importance during retrograde movements.

(2) Operational Considerations.--Offensive air support can effectively support ground retrograde operations whether they be withdrawals or delaying actions. During retrograde operations, the inherent problems and operational characteristics of air support of both offensive and defensive action are combined.

(a) Identification of ground forces from the air is difficult during a period of withdrawal. Ground forces must place emphasis on the marking of positions, installations, and vehicles to ensure their identification by supporting aircraft and preclude their being attacked.

(b) Greater care must be exercised in the positive control of aircraft in direct support of ground elements. The relocation and immediate dissemination of a new FSCL is necessary to ensure the maximum protection of troop safety and coordination of air and ground operations while allowing air maximum freedom in attacking pursuing columns.

(c) Air support can assist in breaking contact with enemy units and providing additional time for landing force elements to withdraw. Armed reconnaissance missions are very effective in this type of operation, particularly when the enemy is pressing the ground units in an attempt to maintain contact.

1 Air fire support to the landing force tends to relieve the pressure on withdrawing elements.

2 These attacks force the enemy to deploy his forces; deny him free access to routes of communications; and disrupt his own fire support, combat, and combat service support elements.

3603. ENVIRONMENTAL FACTORS

Because the MAGTF must be ready to deploy anywhere at any time, it must be prepared to operate in a variety of climates, environments, and weather conditions. Any environment with excessively low or high temperatures presents unique problems for Marine aviation. Commanders must be prepared for these problems and consider them carefully during the planning process. For a detailed discussion of various landing force special operations, refer to FMFM 8-1, Special Operations, and other appropriate manuals of the FMFM series. This paragraph discusses the execution of tactical air operations in four special environments; i.e., desert, jungle, mountain, and cold weather.

a. Offensive Air Support of Desert Operations.--Offensive air operations are especially effective in the desert. In an area where mobile forces with armor are the backbone of ground operations, the extreme effectiveness of aerial munitions, coupled with the range and maneuverability of aircraft and the lack of cover and concealment for ground forces, makes air superiority a must. The excellent flying weather normally present in the desert is favorable to air operations. However, low aircraft availability caused by the effects of sand and the extreme heat can reduce flight operations.

(1) Support of Mobile Forces.--Tactical air operations in the desert are most effective in support of mobile forces. Such forces have great speed and mobility. They require flank protection, long-range reconnaissance, column cover, and route reconnaissance. Such missions can be best performed by tactical aircraft.

(2) Air Missions.--The two general types of air support missions are assigned to air units in support of forces operating in the desert.

(a) Deep Air Support Missions.--Deep air support missions (search and attack or armed reconnaissance) are conducted some distance in advance of the attacking ground forces. Aircraft assigned such missions can do much in clearing the way for the attacking force and can provide considerable information as to indications of the enemy's capabilities.

(b) Close Air Support Missions.--Close air support missions may be utilized to provide flank security in the immediate area of the force and/or to protect the force from attacks.

(3) Operational Problems.--The characteristics of desert areas create significant operational and maintenance problems for aircraft.

(a) Dust and sand infiltrate working mechanisms. They may cause the failure of the mechanism or reduce the service life of the equipment. Consequently, greater emphasis is placed on normal maintenance of aircraft. Requirements for spare parts generally increase.

(b) Fuel and lubricants are much more liable to contamination from dust and sand in the desert. Ground handling equipment is likewise affected by sand and dust. Additional equipment and spare parts must be available; i.e., fuel filters, strainers, etc.

(c) Protective shelters and covers for aircraft and equipment may become mandatory for protection from the sun's heat and sand and dust storms. Personnel working on aircraft must also have this protection.

(d) Blowing dust and sand adversely affect visibility and operations over the battle areas. This is particularly true in battles between mobile forces and battles in which armor, artillery, and heavy weapons are used. This factor has a tremendous effect on ground observation and hinders air observation to some extent. Normally, vertical visibility is better than horizontal visibility and enemy activity can be best observed from the air.

(e) Control of aircraft and air units in a desert operation is difficult. Blowing dust from action of the wind and from the takeoff or landing of aircraft can completely obscure aircraft from visual observation necessary for control. Suitable ground control approach systems must be installed for continuous operations.

(f) At each airfield, target designation and description for air attack in desert areas are difficult due to the sameness of terrain and lack of outstanding landmarks. Maximum use is made of various methods of marking targets and of directing aircraft onto targets.

(g) Recognition is also difficult in desert areas. Friendly tanks and vehicles covered with dust are difficult to distinguish from enemy vehicles. Appropriate means of identification must be employed.

(h) Visual navigation is difficult in desert areas and electronics aids must be provided for air units.

b. Jungle Operations.--In wooded areas and jungles, observation and surveillance are greatly reduced and ground mobility generally slowed. While tactical principles basically remain the same, there are certain factors which directly affect the manner in which air support of ground units can be applied. The difficulties of terrain, climate, and visibility complicate the vital problems of both ground and aviation commanders in locating and establishing operating sites, delivering effective fire support (air, naval gunfire, and artillery), and providing adequate logistic support for the ground and aviation components. Normal procedures are modified to a degree and certain specialized equipment is often necessary to ensure effective air support. Individual training for jungle operations includes thorough indoctrination in survival techniques as well as jungle living, personal hygiene, and care of equipment. Close coordination between air and ground units is mandatory. The employment of techniques to improve fighter/attack unit's air support capabilities, such as electronics devices and air support radar teams, is normally a requirement. The movement of aviation elements supporting ground units (FAC parties, TACP's, ASRT's, DASC, TADC/TACC) and their equipment is greatly restricted in this type of operation. Roads must be constructed for movement of supplies and bulk fuel. The Marine air control elements and the aviation units which establish them require augmentation and assistance in order to displace and reestablish the necessary facilities rapidly in jungle areas.

c. Mountain Operations.--All air units can operate in mountainous terrain; however, special tactics and techniques may be necessary because of the problems imposed by terrain and weather. Mountainous terrain affords cover and concealment to the enemy and limits the altitude and direction from which airstrikes can be conducted. Close air support in a mountainous area presents many safety hazards to attack pilots. Low clouds frequently obstruct the target or friendly positions and "box canyons" inhibit maneuverability over point targets. Terminal control agencies (FAC's and AFAC's) should be aware of the effect that mountainous terrain has on ordnance delivery. The direction of attack is critical. A delivery run downslope requires a near perfect release because any hit beyond the target (12 o'clock) will be magnified in error. Conversely, a run upslope reduces this error. If conditions permit, a delivery run should be directed upslope or across slope; however, care must be taken to ensure sufficient space is available for the aircraft to safely recover after ordnance release. Targets located on top of ridgelines require pinpoint accuracy if the delivery run is made perpendicular to the direction of the ridgeline. A bomb that overshoots the target by a few feet may continue into space impacting harmlessly in the valley below. Delivery runs parallel to ridgelines, although not always practical, provide the greatest degree of safety and probability to destroy the target.

(1) Movement of Aviation Support Units.--The movement of aviation elements and their equipment is generally restricted to roads and improved trails. Both ground and aviation units employ helicopters extensively to assist their mobility in mountainous areas.

(2) Observation and Air Control Site Selection.--Direct observation by airborne observers is the most reliable means of target location in mountainous terrain. Unless forward air controllers, artillery forward observers, and naval gunfire spotters are occupying extremely high terrain, their observation is normally limited to the next hill mass. Airborne observers, as well as airborne forward air controllers, search defiladed areas masked from the ground positions, locate targets, and assist aircraft to conduct more effective air support for ground elements. Communication and radar equipment should be positioned by air control elements (FAC parties, ASRT's, DASC, TADC) to provide the greatest range capability and to assist aircraft in locating and attacking enemy ground targets without being observed by enemy ground forces.

d. Cold Weather Operations.--Aviation units operating under conditions of extreme cold are primarily faced with the problems of survival and mobility. Survival requires provisions for shelter, heat, proper flight clothing, and emergency equipment. Ground mobility is restricted for extended periods. During warmer months, mobility is restricted by thawing ground and the resulting mud and swollen rivers and streams. Heavy winter snow, extreme cold, and reduced visibility adversely affect mobility. When the ground is frozen and snow cover does not exist, there is difficulty in providing adequate protection to personnel and equipment from enemy nuclear and nonnuclear fires due to the difficulty of digging in and/or lack of other protecting installations. Special training and equipment are necessary and should be provided well in advance of the operation so that training can be conducted under conditions similar to those anticipated in the objective area. Winterization of all items of equipment and installation of modification kits must be performed prior to arrival in extremely cold areas.

(1) Flight Operations.--Adverse weather restricts air operations in any area. In arctic areas, it is especially necessary to be familiar with conditions which may affect flight operations. A thorough knowledge of the following conditions, coupled with observance of proper precautions, helps to reduce much of the dangers of operations in the arctic areas:

(a) Engine and airframe icing are extremely hazardous in cold weather operations. The decrease in lift capability because of a very thin layer of ice (e.g., frost) on the wings can prevent an aircraft from getting airborne or maintaining safe flight.

(b) Storms are violent and likely to occur with little warning.

(c) Extensive fog and low overcast are natural products of polar areas and restrict flight operations because of poor visibility. Dry surface snow raised by high winds tends to obscure the ground and the horizon, making visibility poor and obliterating all references to the surface and sky.

(d) Cold weather operations require more careful inspection of aircraft, rigid adherence to prescribed procedures, and more frequent servicing than is necessary in operations under moderate climatic conditions.

(e) Closer attention to detail in aircraft operations is necessary, not only because of the greater strain placed upon the aircraft by low temperatures, but also to reduce mechanical or material failure in flight. Low temperatures increase the difficulty of performing routine mechanical tasks and the time required to complete them.

(f) The use of external power units, engine heating and starting apparatus, wing and engine covers, ice retardants, and other materials is necessary to protect aircraft on the ground and to facilitate having them ready for flight.

(2) Effects on Ordnance.--During extremely cold periods when temperature changes are sudden, ballistics of weapons and ammunition are affected. Point detonating ammunition is normally ineffective in deep snow, since up to 90 percent of the fragmentation is absorbed by the snow cover. To counteract this condition, an airburst using a variable time (VT) or other height setting fuze, is employed. The fuction of VT fuzes is adversely affected by conditions of extreme cold; nevertheless, it is one of the most effective fuzes for arctic operations. Deep snow often has an adverse effect on a chemical bomb by smothering the weapon before it can become effective. White phosphorous (WP) munitions can produce the desired amount of smoke, but the phosphorous particles buried in the snow constitute a hazard to advancing friendly troops for several days.

(3) Movement of Aviation Support Units.--In general, the movement of aviation ground support and air control elements is best performed during the freeze-up period and the first part of winter prior to the arrival of heavy snows. Future displacements are difficult.

(4) Selection and Preparation of Air Facilities Sites.--Sites for landing fields, expeditionary airfields, and other air facilities are selected for their logistic and tactical utility and for protection from

the elements. Supply considerations, especially those of the aviation fuel and munitions, influence the selection of sites. Prior to occupation of a selected site, adequate billeting and working areas, roads, and snow parapets should be prepared. Emphasis on improving the site and providing effective service and operating areas, maximum protection for personnel and equipment, and improving airfield and communication facilities are major factors in development of the area. Shelters for operations and personnel are erected from the materials on hand. Prefabricated buildings greatly simplify the engineer problems and shorten the time required to build adequate shelters. If maintenance personnel are exposed to the elements in servicing and/or repairing aircraft, shelters near the work areas are necessary. Individuals cannot be expected to perform even routine tasks in extreme cold. Camouflage discipline is important, since objects can be quickly spotted in the snow by enemy airborne observers. Equipment painted with white paint and outer garments made of or covered by white cloth can provide winter camouflage. Vehicle tracks normally remain until the next heavy snow or thaw; therefore, movement is restricted to designated trails and roads to prevent compromising positions by visible vehicle tracks.

(5) Observation in Arctic Operations.--Visibility from the air or ground is generally excellent in dry cold and poor in wet cold climates. Movement in snow is very easy to see, particularly from aircraft. During the winter months, good observation is generally limited to a few hours each day because of the short periods of daylight. A greater reliance must be placed upon electronic surveillance means. Snow cover reduces depth perception and obscures ground features and landmarks, making it difficult to ascertain accurate target locations. Sun glare on the snow is intense, requiring dark glasses to prevent painful snow blindness to personnel as a result of continued exposure. On days when the hazy atmosphere blends in with the snow covered terrain or when snow showers inhibit good visibility, aircrews are susceptible to spatial disorientation, where it is difficult to determine where the sky ends and the ground begins (no horizon). This condition requires navigating and maneuvering on aircraft instruments which makes close air support extremely difficult or impossible.

3604. COUNTERINSURGENCY

The continuing possibility of insurgent conditions in many areas of the world requires highly responsive forces to meet the contingencies which may occur. Since most countries of the world are accessible from the sea, amphibious forces provide a unique strategic and tactical counterinsurgency capability. The ability to move freely at sea and in the air, the flexibility to apply the precise force needed, and the quick responsiveness of such forces makes an amphibious force well suited to operations directed at preventing or countering insurgent activity.

a. Airstrikes in Support of a Counterinsurgency Operation.--The role of offensive air support in counterinsurgency operations is more restrictive than in a normal amphibious operation. Close air support, deep air support, and helicopter escort are conducted, but the rules of engagement and the nature of guerrilla warfare place several restraints on the MAGTF commander.

(1) Rules of Engagement.--The impact of the rules of engagement can be significant, but none of the rules should be construed to deter the landing force from defending itself against attack. Some restrictions laid down in rules of engagement are:

(a) Restrictions from airstrikes on populated areas or across international or political boundaries.

(b) Restrictions from "hot pursuit" across international or political boundaries.

(c) Requirement to warn civilian populace of airstrikes to the degree possible without compromising success of the mission.

(d) Requirement to coordinate air operations with the host country government.

(e) Requirement to positively identify target (air or ground) as hostile to host government prior to engagement or attack.

(2) Nature of Guerrilla Activities.--The insurgent guerrilla will attack only when it is to his advantage. When not moving to engage, he will fade into the jungle or the civilian population to avoid detection or engagement with a superior force. These tactics make the coordination of offensive air support very difficult. It is difficult to locate the enemy; it is difficult to distinguish friendly from enemy positions when they are in contact; and when the enemy has infiltrated a civilian population center, an airstrike is not desirable. Although offensive air support against guerrilla activity cannot be applied in the same manner in which it is applied during a normal amphibious operation, it may be effective in counterinsurgency operations by:

(a) Using AFAC's and TAC(A)'s to direct close air support or deep air support against enemy positions or facilities.

(b) Using illumination to counter his nighttime activities.

(c) Using ASRT's to harass and interdict enemy positions, supply routes, and lines of communications at night or in periods of adverse weather conditions.

(d) Using ordnance designed to penetrate forest canopy or detonate a few feet above ground to blast away heavy underbrush the guerrilla may use for concealment.

(e) Using nontoxic gases for harassment of suspected enemy positions.

(f) Using airborne and ground alerts to provide quick response to ground commanders' requests for close air support.

b. Offensive Air Support Limitations in Counterinsurgency Operations.--There are some characteristics of guerrilla warfare that limit the use of offensive air support. The rules of engagement place restrictions on this type operation similar to a conventional amphibious operation. In addition, the commander landing force must consider the following:

(1) Suitable landing fields for fixed-wing operations may not be available. The expeditionary landing fields are suitable for fixed-wing, but the logistic requirements dictate a site close to a beach or harbor which may not be available.

(2) Insurgents will frequently use innocent civilians as shields or hostages. This tactic limits the employment of close air support.

(3) The political situation may severely limit the employment of air support. The host country may desire a minimum use of offensive air support.

(4) The fact that most sparsely populated areas are under the control of the insurgents creates a significant problem for escape and evasion. Aircrews are susceptible to being taken prisoner or executed by the enemy. Therefore, an efficient sea-air rescue (SAR) operation must be made available.

(5) Counterinsurgency operations most probably would be employed in underdeveloped countries. Navigational aids would not be available and maps may be outdated and inaccurate.

3605. NONCOMBATANT EVACUATION

Marine aviation has frequently been given the mission of evacuating noncombatant personnel. Both U.S. and foreign citizens have been evacuated from disaster areas; i.e., floods and earthquakes; and from areas threatened by the outbreak of hostilities; i.e., local uprisings, civil war, or invasion from a foreign power. Over the years, Marines have been involved in mercy missions, but the largest operation to date was the evacuation of U.S. and South Vietnamese citizens from Saigon, Republic of South Vietnam in April 1975. Slightly less than 7,000 personnel were evacuated by helicopter to ships off the coast of South Vietnam. Noncombatant evacuations may, therefore, be classified in two categories: evacuation from a disaster area and evacuation from hostile areas. Both operations require extensive planning, precision timing, and considerations not associated with conventional amphibious operations.

a. Employment.--Evacuating personnel from areas threatened by hostilities will normally require an MAGTF. The landing force should be tasked with providing helicopters for transport of troops and noncombatants and helicopter escort; fixed-wing for SEAD air reconnaissance, helicopter escort, and close air support; and ground troops for security of the landing zones. Offensive air support would provide the helicopter escort, SEAD, and close air support. The MAGTF will be an element of an ATF, task organized especially for air evacuation and geared to the number of evacuees and degree of hostilities anticipated.

b. Principal Considerations.--When employing offensive air support in noncombatant evacuation from a hostile area, the following should be considered:

(1) The U.S. Ambassador is the "on scene" commander ashore. He will have authority over the military force involved.

(2) Maps should be available indicating grid coordinates, streets, buildings, and any other landmarks that would assist navigation and communications.

(3) The evacuation may be conducted from within or near an urban or built-up area. This places many restrictions upon the use of close air support.

(4) If the evacuation is opposed, operations during periods of darkness and reduced visibility will minimize damage or losses from AAA, small arms fire, and missiles.

(5) Fixed-wing aircraft should be available for helicopter escort.

(6) Sufficient aircrews should be available to allow for adequate crew test.

(7) Lights, traffic, and fires will make targets and small arms fire difficult to detect.

(8) Planning for adequate command and control should consider:

(a) The use of a common language between all of the armed forces involved.

(b) Coordination among helicopters, fixed-wing aircraft, the on-scene commander ashore, the TACC afloat, HDC, MAGTF commander, and the CATF.

(c) The employment of an airborne DASC for coordination and control of aircraft in the evacuation area.

(9) A noncombatant evacuation from a hostile area will probably receive world-wide attention. The forces involved must be prepared for extensive news coverage, continuous situation reports (SITREPS) to higher authority, and a policy for courteous and timely response to the many inquiries that will originate from outside of the chain of command.

(10) A noncombatant evacuation from a hostile area may develop into a complex, drawn-out, and tense operation. It is highly desirable that commanders utilize their most experienced and responsible personnel whenever possible.

c. Targets and Ordnance

(1) The tactical air commander should anticipate the assignment of targets posing a threat to the evacuation operation. If the evacuation is opposed, offensive air support may be directed toward:

(a) Small arms fire, AAA, and missile batteries threatening helicopter operations.

(b) Artillery, mortar, and heavy weapons positions directing fire toward evacuation sites and helicopter landing zones.

(c) Armored vehicles or columns directing fire toward evacuation sites or helicopter landing zones.

(d) Positions from which offensive air support aircraft are receiving antiaircraft fire.

(e) Positions from which evacuation shipping is receiving threatening or damaging fire.

(2) The TAC should be prepared to have ordnance available to accomplish any of the above tasks.

d. Rules of Engagement.--Noncombatant evacuation operations are politically sensitive and require a very judicious use of force. The decision to direct fire at targets will be the responsibility of the CATF or a higher authority. Aircrews will be under very strict rules of engagement and must receive extensive briefing and intelligence prior to each mission. Command and control must be efficient during all missions.

Section VII. VERTICAL/SHORT TAKEOFF AND LANDING

3701. GENERAL

V/STOL operations are characterized by a high degree of flexibility that has been thoroughly, but not yet completely, explored. This unique capability of V/STOL aircraft should not be viewed in terms of providing a different type of offensive air support. Rather, V/STOL operations add a new dimension to already proven concepts.

3702. DEFINITIONS

a. Phases I, II, and III.--This is a distinct sequence of V/STOL support to the landing force.

b. Sea Base.--A sea base is a ship capable of transporting, stowing, and operating a complement of V/STOL aircraft. These incude the CVA, LPH, and LHA. A sea base will be capable of launching V/STOL aircraft in the short takeoff (STO) mode with full fuel and ordnance load, will have facilities for intermediate maintenance activities (IMA) and organizational maintenance activities (OMA), will be capable of extended day/night and visual flight rules/instrument flight rules operations, and will be used during phases I and II of a V/STOL amphibious operation.

c. Sea Platform.--A sea platform is any ship capable of operating a V/STOL aircraft and providing minimum support, such as an LPD. A sea platform is capable of day, VFR, and VTOL operations only, can provide limited ordnance loading and refueling, and may be used during phases I and II.

d. Main Base.--A main base is a location ashore which can provide all support required for extended operations of V/STOL aircraft, including maintenence, personnel, billeting, command and control, logistics support, and ordnance support. (See fig. 24.) A main base may be as far as 100 miles from the forward edge of the battle area (FEBA) and will be used during phase III.

e. Facility.--A facility is a location ashore which can provide limited support for V/STOL aircraft, including refueling, maintenance, ordnance, personnel facilities, air operations support, and an area for takeoff and landing. It will generally be 40 to 50 miles from the FEBA and will be used during phases II and III. (See fig. 24.)

f. Forward Site.--A forward site is a location ashore which is suitable for takeoff and landing of V/STOL aircraft. A site normally will be austere, located in a secure area (nominal distance is 20 nautical miles from the FEBA), and can consist of AM-2/AM-6 matting, a road, a parking lot, or a grass field. It may be used during phases I, II, and III of a V/STOL amphibious operation. (See fig. 24.)

g. Vertical Takeoff (VTO).--For an AV-8, this maneuver requires a solid surface such as AM-2/AM-6 matting, good concrete, or a ship's deck.

h. Vertical Landing.--This maneuver also requires a solid surface.

MINIMUM REQUIREMENTS	MAIN BASE	FACILITY	FORWARD SITE
Capability	Full support	Turnaround	Land and Launch
Nominal Number of AV-8's	20	6 to 10	1 to 4
Maintenance	IMA, OMA	Limited OMA	None
Ordnance	Storage, Assembly, and Handling	Storage and Handling	None
Fuel	Storage and Refueling	Storage and Refueling	None
Billeting	400 to 500 Personnel	78 to 116 Personnel	None
Landing and Takeoff Surface	1,500 Ft. Strip	600 Ft. Strip	72 Ft. x 72 Ft. or Existing Hard Surface
Landing Aids	All Weather	Day/TACAN Night	Minimum
Access	Road or Beach	Surface or Helicopter	Helicopter

Figure 24.--Base Characteristics.

i. Rolling Vertical Takeoff.--In this maneuver, the aircraft is allowed to roll forward for a short distance (approximately 100 feet) to gain some airspeed prior to takeoff. A rolling vertical takeoff precludes exhaust gas reingestion, possible damage due to foreign objects entering the engine, and possible damage to the landing surface. This significantly reduces the need for the solid, clean surface required for a VTO.

j. Rolling Vertical Landing.--This is a landing performed with approximately 50 knots of forward speed and is utilized for the same reasons as listed above for a rolling vertical takeoff.

k. Short Takeoff.--This is a takeoff performed using a combination of jet engine lift and aerodynamic wing lift. An STO will require from approximately 400 to 1,200 feet of ground roll.

l. Slow Landing.--This is a landing of approximately 80 to 100 knots using a combination of jet engine lift and aerodynamic wing lift.

m. V/STOL.--This refers to an aircraft capable of performing vertical/short takeoffs and landings; for example, the AV-8.

3703. CONCEPT OF BASING

a. General.--Responsiveness, and the timeliness of that response, is a critical factor in evaluating the effectiveness of a supporting arm.

b. Responsiveness.--Several factors determine responsiveness, not the least of which is the number of aircraft on hand. However, when a fixed number of aircraft assets are allocated, responsiveness can be enhanced by:

(1) Availability of Operationally Ready Aircraft.--Present V/STOL aircraft, when properly supported, maintain a percentage of mission capable aircraft comparable to conventional fixed-wing aircraft presently in the inventory. Future V/STOL aricraft can be expected to continue this trend.

(2) High Sortie Rate.--Present V/STOL aircraft have proven that more sorties per aircraft per day can be anticipated from V/STOL aircraft than from conventional aircraft. This is achieved primarily due to high reliability and the shorter mission times appreciated with forward based aircraft.

c. Timeliness.--A supporting arm must be capable of providing firepower in a timely manner. Aircraft overhead are totally useless if the battle has already been decided. Different combat situations may require a varying degree of support response time, but it is an extremely rare occurrence when the using organization can complain of air support being overhead too soon. V/STOL aircraft are capable of significantly improved response times to air support requests, primarily because they may be based much closer to the supported unit than conventional fixed-wing aircraft.

d. Basing Posture.--As the beachhead expands and the battle area moves farther inland, the basing flexibility of V/STOL aircraft allows timely air support to accompany the ground units by adherence to the following concept of operations:

(1) Phase I, Operation From Sea Bases.--V/STOL aircraft will operate from sea bases until the assault elements are ashore and have control over a reasonable beach area. Short takeoff/vertical landing operations are preferred, but vertical takeoff/vertical landing may be necessary to enhance concurrent helicopter operations. Depending upon deck congestion aboard the sea base, consideration should be given to utilizing available sea platforms, particularly since sea platforms could very well be located closer to the beachhead. As the beachhead expands, a forward site may be established ashore to provide further flexibility and dispersal of assets.

(2) Phase II, Initial Operations Ashore.--As soon as practicable, a facility will be established ashore (a forward site may have been expanded to create the facility). The sea base will continue to provide main basing services, but the majority of offensive air support sorties will be flown from the facility. As the need arises, forward sites may be established to ensure basing compatible with rapid reaction operations. If available, sea platforms may continue to be used as desired to achieve optimum flexibility.

(3) Phase III, Fully Operational Ashore.--As the combat situation dictates, it may be desirable to establish all V/STOL operations ashore requiring establishment of a main base. A facility may be expanded to provide main basing, or a captured airfield might be utilized. Concurrently, additional facilities and forward sites normally would be constructed/established, always with a view toward the driving factor in V/STOL basing concepts; i.e., base the aircraft as close to the supported units as is feasible. Ideally, fuel and ordnance would be staged at forward sites close to the FEBA, thereby allowing aircraft to refuel and rearm without returning to the facility or main base. Although this type of effort poses a variety of logistics and personnel problems, it is extremely desirable. Forward site operations provide the most timely offensive air support possible, and if responsiveness is to be maximized, sorties cannot be expended returning to the facility/main base for anything but essential maintenance repairs.

e. Summary.--The flexibility of V/STOL aircraft in a dynamic combat situation is limited only by the imaginative innovations developed by both air and ground units alike. Stereotyping, either because of temerity or failure to communicate, must be avoided.

3704. CONSIDERATIONS FOR THE OFFENSIVE EMPLOYMENT OF V/STOL AIRCRAFT

Generally, the advent of V/STOL aricraft has not given rise to a need for doctrinal changes to the Marine air command and control system. However, the unique flexibility offered by a V/STOL force has surfaced the need for a certain amount of correspondent flexibility in the command and control system.

a. Deep Air Support/Interdiction.--V/STOL aircraft will be capable of performing deep air support and aerial interdiction sorties. The launch point may differ from conventional fixed-wing bases because V/STOL sorties may originate from a variety of locations as previously discussed in paragraph 3703. This flexibility, and the high sortie rate associated with V/STOL aircraft will be invaluable should a particularly lucrative target be discovered which requires immediate response and/or a significant number of extra missions to neutralize or destroy the enemy.

b. Close Air Support.--CAS supplied by V/STOL aircraft will not differ significantly from conventional fixed-wing aircraft except in regard to the following:

(1) V/STOL aircraft may be operating from the decks of amphibious shipping and will be phasing ashore as soon as such a move is tactically and logistically feasible. This may result in a request for air support in a threat environment where enemy air defense systems have not yet sustained significant damage and remain potent.

(2) Forward Basing of V/STOL Aircraft.--Since the tactical air control party is landed concurrently with a battalion or regimental command post and is collocated with the FSCC it is possible that employment of V/STOL aircraft early in the assault could be accomplished by locating a forward site close to the TACP/FSCC's, assuming that the supported unit can provide security. In this situation, the V/STOL aircraft is placed in the optimum location for immediate response to the ground commander's air support needs. The TACC/TADC or DASC, acting upon order of the CATF/CLF, may allocate V/STOL aircraft to forward sites in "direct support" of a ground unit. This unit would be authorized to launch the mission without experiencing even the limited processing delays occasioned by the MACCS. This procedure would not change the existing MACCS, but would shorten reaction time simply by allowing the pilot to complete the RIO procedures prior to the assignment of a specific mission. The V/STOL aircraft is launched by use of the TACP communication nets, and would be directly responsive to the needs of the particular ground commander. The TACC/TADC or DASC, as appropriate, will monitor the request, and by silence will indicate approval. The DASC or TACC/TADC retains the option of diverting the assigned aircraft either before or after launch. This option permits massing of assets, or diversion to more critical missions as are traditionally the capabilities of air control agencies. Generally, the effectiveness of a CAS mission increases as the reaction time decreases. There is, at present, no other method of employment capable of providing air support in as timely a manner.

c. Air Defense Operations

(1) Due to their basing flexibility, V/STOL aircraft are phased ashore early and thereafter will probably be based farther forward than conventional fixed-wing aircraft. Although air defense will normally be provided by fighter aircraft operating from advanced bases or aircraft carriers, the V/STOL concept of employment may require providing self defense from an airborne threat. This is true both of enemy air attacks against V/STOL aircraft engaged in offensive air operations and also of enemy air attacks against facilities, forward sites, or ground loitering aircraft. Indeed, it is conceivable that in small scale amphibious operations, V/STOL aircraft would be the only fixed-wing air support available. In this context, V/STOL attack aircraft are capable of providing limited protection for the supported ground units from enemy offensive air attack.

(2) The impact of performing air defense operations upon the primary mission of offensive air support could manifest itself in two ways. First, the air defense requirement could cause a decrease in the number of sorties available for ground attack, since entire sorties might have to be dedicated to air defense. Alternatively, the ordnance payload available for the ground attack mission may be reduced by the necessity to replace a portion of the air-to-ground ordnance with air-to-air weaponry.

3705. LOGISTICS CONSIDERATION

The management of logistics; i.e., site selection and construction, resupply of fuel and ordnance, aircraft maintenance, etc., offers a challenging opportunity. It is considered beyond the scope of this manual to provide detailed instructions, but the following information will aid the CATF/CLF in planning and executing V/STOL support for an amphibious operation.

LOCATION	EQUIPMENT	MATERIAL	MANPOWER	TIME
AVAILABLE AIRFIELD	NONE	NONE	NONE	NONE
DAMAGED AIRFIELD/ROAD	NONE	NONE	SMALL CREW	NEGLIGIBLE
FLAT OPEN GRASSLAND	NONE	72 x 72 FOOT AM-2 MATTING	16	LESS THAN 8 HOURS
ROUGH OPEN TERRAIN	TRACTOR & ROLLER	72 x 72 FOOT AM-2 MATTING	18	WITHIN 1 DAY
LIGHT FOREST	TRACTORS, GRADERS, & ROLLERS	72 x 72 FOOT AM-2 MATTING	19-25	1 TO 2 DAYS

Figure 25.--Buildup Requirements for Forward Site.

a. Site Selection.--Imagination and ingenuity on the part of the planner must be utilized in the task. The following questions should be considered:

(1) Is the site really necessary? Will the benefit to be gained by timely response from a particular site be worth the effort of activating the site, or will the FEBA have moved beyond range by the time activation is complete?

(2) What is available on the ground? The ideal would be to capture an enemy airfield, but the chances of this are admittedly quite slim in some theaters of operation. Rather, the planners should look for areas that are usable as they stand (e.g., roads) or areas that require minimum work such as that upon terrain. Figures 25 and 26 show appropriate build-up requirements for construction of a minimum forward site.

ITEM	PAD ONLY		PAD AND PARKING AREA	
	1 DAY	2 DAYS	1 DAY	2 DAYS
450 TRACTOR	2	1	4	2
LIGHTWEIGHT ROAD GRADER	2	1	2	1
SHEEPSFOOT ROLLER	1	1	1	1
WOBBLY WHEEL ROLLER	1	1	1	1
MEN	22	19	25	21

Figure 26.--Quantity of Equipment/Personnel for Forward Site Buildup.

	ROUGH OPEN TERRAIN		LIGHT FOREST	
	1 DAY	3 DAYS	1 DAY	3 DAYS
TRACTORS	10	4	14	6
SCRAPERS	4	2	4	2
GRADERS	2	1	2	1
ROLLERS	3	2	3	2
DUMP TRUCKS	6	3	6	3
FORKLIFTS	4	4	4	4
MEN	95	72	87	72

Figure 27.--Quantity of Equipment/Personnel for Facility Buildup.

(3) Will a proposed site be upgraded to a facility/main base? Will it be further upgraded to a conventional aircraft expeditionary airfield? If so, the minimum requirements for the upgraded base must be met in the original site survey. Approximate requirements for upgrading to a facility and main base are shown in figures 27 and 28.

(4) Is the proposed site accessible for resupply if required? For example, 20 AV-8 aircraft flying 80 sorties in 1 day from a main base may consume as much as 322,000 pounds of ordnance and 320,000 pounds of jet fuel. Six AV-8 aircraft flying 24 sorties in a day may require 96,000 pounds of ordnance and 96,000 pounds of fuel.

	FLAT OPEN GRASSLAND		ROUGH OPEN TERRAIN		LIGHT FOREST	
	1 DAY	3 DAYS	1 DAY	3 DAYS	1 DAY	3 DAYS
TRACTORS	7	3	30	11	38	14
SCRAPERS	3	1	12	4	16	6
GRADERS	3	1	5	2	5	2
FORKLIFTS	-	-	4	3	4	3
MEN	78	63	140	87	158	94

Figure 28.--Quantity of Equipment/Personnel for Main Base Buildup.

b. Transportation.--The exact number of vehicle/helicopter sorties to support V/STOL operations will vary with the number of sites supported. Suffice to say, with the extremely flexible basing posture of V/STOL aviation, the amount of transportation support will be slightly greater than for a conventional fixed-wing squadron operationg from a fixed base in the rear areas. This added requirement will be more than compensated for by the rapid response air support available to the ground commander.

c. Aircraft Maintenance.--The requirements of aircraft maintenance will vary with the level of basing of V/STOL aircraft. The only added requirement will be the effort necessary to recover malfunctioning aircraft from forward sites. This occurrence is unlikely, but if it should happen, the response must be rapid and in sufficient force to preclude the unnecessary loss of an aircraft.

3706. SUMMARY

V/STOL aircraft offer a flexibility to Marine offensive air support previously unexperienced. In order to employ V/STOL aircraft so as to derive maximum benefit from their unique capabilities:

a. Ground and air commanders should actively seek new outlets for demonstrating and maximizing V/STOL flexibility. V/STOL operations are an ever-expanding field that must not be allowed to stagnate.

b. The advantage of generating rapid response and high sortie rates carries with it a susceptibility to misuse aviation assets. Offensive air support should be used to augment, and not to replace, organic firepower.

CHAPTER 4

OFFENSIVE AIR SUPPORT PLANNING

Section I. INTRODUCTION

4101. GENERAL

The MAGTF is designed to operate as the landing force or as a component of a larger landing force. To this end, organic Marine aviation within the task force contributes to the execution of the operation as landing force aviation. Specific considerations apply to the offensive air support portions of this aviation element in the planning sequence.

4102. PLANNING GUIDANCE

As soon as practicable after the receipt of the initiating directive, the CATF issues a planning directive to ensure that interdependent plans are coordinated, completed according to the time limitations, and comprehensive in their scope. This directive specifies the principal plans to be prepared and the time allotted for this preparation. Then each successive commander; i.e., landing force, ground, and aviation, prepares a planning program containing his force planning schedule. This planning guidance, at any level, may be either oral or written and is prepared for and given to subordinate commanders and staffs. It also provides the needed information for concurrent, parallel, and detailed planning for the subordinate unit commanders involved, as well as a framework for the necessary studies and estimates. It serves, for instance, as a guide for the preparation of aviation staff estimates. As soon as the CLF provides his initial planning guidance, the MAGTF aviation commander will issue his guidance to aviation subordinates. Such guidance is updated throughout the planning phase by directives, memoranda, outlines, plans, staff conferences, and informal briefings.

4103. PRELIMINARY PLANNING DIRECTIVES

Preliminary planning directives augment the CATF planning guidance and may, in fact, precede the initiating directive. They are based upon alerting notices received by commanders providing forces for the amphibious task force. Although the format of such alerting notices are too varied to be defined, they will be definitive enough to permit an analysis of the area of operations and an assessment of additional intelligence requirements. Study of beaches, ports, communication networks, existing air facilities, and terrain provides an initial basis for determining the number and types of landing force air elements that can be accommodated and supported within possible landing areas.

4104. SEQUENCE OF AIR STAFF PLANNING

The sequence of planning air support, as it affects the landing force, includes the following steps:

a. Receipt of Initiating Directive.--The initiating directive is an order to the CATF, with copies to the landing force and major component commanders, to conduct an amphibious operation. The initiating directive provides for the establishment of an ATF, the assignment of a mission, and the necessary forces to accomplish the mission.

b. Initial Estimate of Landing Force Air Support Requirements.--Aviation planning commences with the preparation of initial estimates of landing force air support requirements to include offensive air operations. These estimates are prepared as soon as initial information of an operation is received by the CLF. At this time, only the broadest estimates can be made. These initial estimates are usually limited to those which tentatively determine the number and type of participating units, the control agencies necessary, and the logistic support required.

c. Initial Planning Conference.--Subsequent to the receipt of the initiating directive, the CATF conducts an initial planning conference. At this stage, the CATF and the CLF jointly render decisions on issues which concern all of the elements of the ATF, both landing force and naval. The initial estimate of landing force air support requirements assists the CLF in reaching the basic decisions at the initial planning conference. Included in the basic decisions are the selection of landing force objectives, the development of the landing force concept of operations ashore, the selection of helicopter landing zones, and the selection of fixed-wing aircraft landing fields and drop zones.

d. Commander Landing Force's Planning Guidance.--Planning guidance is derived from a consideration of the information contained in the initiating directive, the initial planning conference, and other instructions that may be received. This guidance is the commander's input to his staff and subordinate commanders for preparation or revision of their estimates. The commander's guidance may take a wide variety of forms and includes a variety of information, but will normally outline broad and general courses of action which the commander particularly desires to be initiated. Subsequent planning guidance will be provided to all levels throughout the planning process.

e. Aviation Estimate of Supportability.--The aviation estimate of supportability summarizes significant aspects of the situation as they influence any proposed course of action, analyzes the impact of aviation factors upon the particular situations, then evaluates and determines how aviation units can be best employed in support of each contemplated landing force course of action. The aviation estimate is presented verbally or in writing to the CLF by the landing force aviation element commander. This estimate is discussed in detail in section V of this chapter.

f. Commander Landing Force's Estimate.--The CLF selects the most favorable course of action in his estimate and announces it as his decision. The commander's decision provides a firm basis for subsequent development of the operation plan, and appropriately amplified, it becomes the commander's concept of operations ashore.

g. Detailed Estimate of Air Support Requirements.--Detailed planning of landing force air support requirements commences after the CLF issues his concept of operations. The detailed estimate of air support requirements establishes the number and type of aircraft in terms of squadrons that will be needed to support the operation. It also provides information concerning the use of nuclear weapons, enemy targets in the beachhead area, enemy targets remote from the beachhead which may affect the force, air reconnaissance necessary to support the operation, assault support operations in and about the landing area, and the control facilities necessary to support the commander's concept of operation. Attention is given to the time required to locate and prepare facilities and/or sites which will assist the aviation component in the early establishment of aviation units ashore. Special consideration is given to the aviation requirement to conduct AAW operations. A further discussion of this estimate is contained in section VI of this chapter.

h. Aviation Concept.--The final step in the aviation staff planning sequence is the preparation of the aviation concept of operations. Additionally, completion of the aviation element task organization requires inclusion of all aviation support units needed for the tactical units specified in the detailed estimate of air support requirements. Air operation plans and orders may now be prepared.

Section II. BASIC ELEMENTS OF AIR SUPPORT PLANNING

4201. GENERAL

Upon receipt of the ATF and landing force initial planning directives, preliminary air support planning is commenced. Closely allied with the evolution of the basic decisions is the determination of requirements, the allocation of means, and the reconciliation of the means available with the requirements for shipping, landing means, and fire support. In applying the process to air support planning, a general balancing of aviation requirements versus aviation capabilities is normally adequate. The means initially available seldom satisfy stated requirements; therefore, reconciliation of these factors continues throughout the planning cycle. The following paragraphs cover the principal considerations involved in air support planning.

4202. CENTRALIZED CONTROL

In an amphibious operation, a single integrated air control system is developed that is capable of controlling and coordinating all air operations within an assigned area of responsibility. Control of air operations is exercised by various commands as the operation progresses. Plans must be made to provide each of these controlling commanders with the proper facilities for the requisite centralized control. As soon as conditions permit, air control facilities are established ashore that parallel the naval control agencies afloat. The control facilities ashore are initially held in a standby status, monitoring all air control circuits. Upon recommendation of the commander landing force (or appropriate agencies ashore), the CATF may pass control of air operations to CLF or the joint task force commander concerned. The passage of control may be incremental. After passage of any or all control functions ashore, the Navy control centers afloat continue to monitor appropriate circuits, ready to resume active control in the event this becomes necessary. Section III of chapter 5 discusses control in further detail.

4203. ACHIEVEMENT OF LOCAL AIR SUPERIORITY

Success in an amphibious operation requires a distinct margin of air superiority in the area of its operations. Because complete destruction of enemy air strength is rarely attained, all elements of the amphibious task force must be provided with continuing air defense throughout the operation. Air superiority is gained and maintained only through offensive and defensive operations that exploit the capabilities of all participating forces. Both types of operations are essential; neither alone can provide the degree of air superiority needed for the decisive joint application of military power. Planning and execution of this effort must be closely coordinated with all other operations in the objective area to ensure that friendly aircraft have freedom of action and, conversely, that it is denied to the enemy. Attack aircraft may be employed in antiair warfare operations designed to destroy the enemy threat (aircraft, missiles, radar systems, and command and control facilities) on the ground. This employment is considered to be antiair warfare, for the purposes of this manual, and is discussed in FMFM 5-5, Antiair Warfare.

4204. ACCESS TO CONTROL AGENCIES

Plans must ensure that all landing force command levels are provided direct access to the agency exercising control of aircraft allocated to direct air support. Intermediate ground command levels may countermand or modify requests of subordinates for direct air support at the time the requests are made to the air support control agency. The means for providing the access is via the tactical air request net. The following is a summary of participation from the coordinating agency point of view:

a. TACC/TADC.--As the supervisory authority for the MACCS, the TACC/TADC monitors the current status of air operations. This is accomplished by receiving inputs from the DASC and TAOC concerning the specific functional activity for which they are responsible. The TACC/TADC consolidates this information and employs it in supervisory decisions. The TACC/TADC normally controls ground alert CAS aircraft, as well as possessing the authority to divert aircraft from preplanned missions for immediate requirements. Both of these functions may be delegated to the DASC, if the situation allows, and if priorities are clearly defined. The DASC and/or TAOC receive the final mission assessment for the missions conducted and forward this information to appropriate agencies as designated by the tactical air commander.

b. TAOC.--The TAOC participates in the conduct of direct air support primarily by providing aircraft movement control. For aircraft flying longer distances in the objective area, the TAOC provides flight separation data to ensure flight safety. The TAOC coordinates with the DASC on aircraft identification and radar handovers for ASRT's. It controls aircraft initially entering the sector to participate in direct air support missions. Finally, it controls the conduct of air refueling operations assigned in support of direct air support missions. Early warning and control (EW/C) sites function in a manner similar to the functioning of the TAOC, but to a more limited degree.

c. MATCS.--MATCS's participation in the conduct of direct air support missions is threefold. First, it is concerned with the launch of some direct air support aircraft from ground alert status and provides for the aircraft safety associated with a "hot pad" of any type. Second, MATCS requires fire support coordination information from the DASC to provide for the safety of aircraft under its control, either departure/recovery aircraft, or aircraft for which it is providing flight following. The final task performed is providing flight following and positive radar control as required for direct air support missions operating within their control area.

d. DASC.--The DASC is the central coordination agency for direct air support. The DASC receives immediate requests from ground units directly and through the FSCC, if necessary. It receives aircraft by category from the TACC/TADC for commitment to ground unit support. It coordinates with the TAOC for some en route aircraft. Aircraft under its control are passed to terminal control agencies for actual mission execution. It integrates direct air support activity with the senior FSCC and provides designated MAGTF agencies with information on fire support coordination measures, restrictions, and controls. The DASC directs and coordinates the employment of subordinate ASRT's. Finally, the DASC determines routes of approach and retirement for aircraft under its control.

e. TACP.--The TACP is the agency representing ground elements within the direct air support sequence of events. It forwards requests for air and executes control of received air missions. It advises the ground elements on the use, availability, and techniques/requirements to make the most economical use of direct air support missions. It provides the aviation representation in various level FSCC's for fire support coordination purposes.

f. TAC(A)/AFAC/NAO.--The TAC(A)/AFAC/NAO may request and receive aircraft from the DASC for control as instructed by supported ground units, or as prompted by the mission he is assigned. Further, the TAC(A)/AFAC/NAO, in conjunction with with the HC(A), will act as a coordinating controller when fixed-wing and helicopter aircraft are operating in proximity to one another and a ground controller is not available.

g. HC(A).--The HC(A) assists the DASC or HDC in the coordination and control of helicopters. An HC(A) normally is utilized only for the initial assault and works closely with the TAC(A) to ensure coordination of helicopter movement with fixed-wing aircraft employment during combined fixed-wing and helicopter operations.

4205. DEPLOYMENT OF AIR UNITS

Offensive air support units normally will be deployed by air. The aircraft will be ferried by aircrews utilizing aerial tankers as necessary to extend their range. The most likely means of moving support personnel and equipment is via air transport. Deployment may be either directly to the landing area or to airfields in friendly territory adjacent to the landing area.

a. Landing Area.--Plans should provide for early seizure of sites for operating aircraft and air control facilities in order to:

(1) Provide for the early deployment within the objective area of air units designated for continuing support of the landing force.

(2) Extend the radius of warning and control and, thus, improve the task force air defense capabilities.

b. Adjacent Areas.--Plans providing for deployment of aircraft to airfields in friendly territory adjacent to the amphibious operation area must be prepared to:

(1) Facilitate rapid deployment to airfields within the objective area.

(2) Provide for the support which may only be acquired through the use of aerial tankers to extend the range of supporting aircraft.

4206. AIRCRAFT AVAILABILITIES

Initially, air support which is preplanned in detail must be provided by aircraft operating from carriers or bases within effective range of the objective area. As the facilities for operating landbased aircraft are secured within the objective area, aircraft operating from such facilities are employed through the tactical air control system to fulfill an increasing amount of the total air support needs. Plans must assure that the transition into the objective area can be made without interrupting the effectiveness of the air support. Aircraft are phased into the landbased facilities to shorten response time and, therefore, to improve air support effectiveness.

4207. TRANSFER OF AIRSPACE CONTROL

Plans must provide for the orderly transfer of airspace control throughout the amphibious operation. The following subparagraphs outline the transfer sequence which, if employed, must be the subject of detailed planning. More detailed guidance may be found in LFM 04/NWP 17, Doctrine and Procedures for Airspace Control in the Combat Zone.

a. Airspace Control Authority.--The area airspace control authority of the joint force commander exercising control over the combat zone in which the amphibious objective area is located transfers control to the advance force commander of the amphibious task force.

b. Advanced Force Commander.--The advanced force commander transfers airspace control to the commander amphibious task force.

c. Commander Amphibious Task Force.--The commander amphibious task force passes control to the commander landing force or other commander ashore.

d. Commander Landing Force.--Upon the termination of the amphibious operation, the commander landing force transfers control back to the area airspace control authority of the appropriate joint force commander.

Section III. PLANNING RESPONSIBILITIES

4301. GENERAL

Planning in detail ensures the maximum support from the available aircraft, while avoiding unnecessary degradation of the air support capability. Planning, however, is a coordinate responsibility of all concerned. Although specifically defined herein as the responsibility of one command or commander, the parallel and concurrent characteristics of planning common to all amphibious operations are also applicable to air support.

4302. AMPHIBIOUS TASK FORCE

The CATF has the following responsibilities:

a. Determination of Overall Requirements of the Amphibious Task Force.--Naval requirements remain generally constant throughout the operation. Air superiority must be attained and maintained in the objective area, and the movement of enemy forces into and within the objective area must be curtailed or halted. A continuing requirement exists for air defense against enemy air, surface, and subsurface attack.

b. Determination of Air Support Capabilities.--The CATF determines the air support capabilities of the entire task force in terms of sorties, endurance on station, ordnance loads, and payloads.

c. Coordination of All Air Support Tasks.--The CATF coordinates all requests for air support originating within the task force and allocates aircraft in accordance with the ATF assets and capabilities. When the need arises, he makes requests for additional support to higher authority.

d. Preparation of an Air Plan.--The CATF prepares an air plan to govern the employment of aviation throughout the operation. The air plans of subordinate commanders of the amphibious task force must conform to the amphibious task force plan.

4303. LANDING FORCE

The CLF has the following responsibilities:

a. Determination of Landing Force Air Support Requirements.--The CLF coordinates all requests for air support originating within the landing force, and submits the consolidated requirements to the CATF.

b. Determination of Landing Force Air Support Capabilities.--The CLF determines the air support capabilities of the landing force aviation units and submits this information to the CATF.

c. Submission of Plans for Deployment of Aviation Elements Ashore.--The CLF submits recommendations to the CATF for the deployment ashore of landing force and other aviation units.

d. Preparation of an Air Plan.--The CLF prepares an air plan in coordination with the amphibious task force air plan.

4304. LANDING FORCE AVIATION

Landing force aviation planning responsibilities are:

a. Determination of Landing Force Aviation Air Support Requirements.--The landing force aviation commander submits requests for air support to the CLF. These requests are consolidated with those from other landing force elements.

b. Determination of Landing Force Air Support Capabilities.--The landing force aviation commander submits the air support capabilities of landing force aviation units to the CLF.

c. Submission of Plans for Deployment of Aviation Elements Ashore.--The landing force aviation commander submits recommendations to the CLF for the deployment ashore of landing force aviation units.

d. Preparation of an Operation Plan.--The landing force aviation commander prepares an operation plan in coordination with the amphibious task force and landing force air plans.

4305. AVIATION UNITS

Aviation units are responsible for providing input as required by the landing force aviation commander regarding their needs and capabilities. Normally, the planning directive published by the landing force aviation commander will contain the necessary guidance as to the type and timeliness of information required.

a. Needs.--Identified here will be personnel and support equipment shortfalls, training requirements, and other items that the commander deems necessary. In addition, the envisioned employment of the organization will permit the commander to predict his need for work spaces, billeting and messing facilities, security, and those other matters which are affected by the conditions of employment. Here is where climatic considerations will be very much in evidence.

b. Capabilities.--As limitations on the expected capabilities of an organization may be encountered due to the lack of personnel, equipment, and training, it is prudent to establish the capabilities as they exist. Further, the increase in capabilities provided through the acquisition of personnel and equipment, and the accomplishment of training must be delineated to ensure that the landing force aviation commander can adequately determine the readiness of his force.

Section IV. INITIAL ESTIMATES OF LANDING FORCE AIR SUPPORT REQUIREMENTS

4401. GENERAL

The initial estimates of landing force air support requirements is prepared as soon as preliminary information of an operation is received. At this time, only the broadest estimate can be made. This initial estimate may only include the number and type of units selected, the control agencies necessary, and the logistic support required. Some of the air support allocations can be deduced from the aviation capabilities of the force involved, estimations of the enemy air which might be encountered, and the general mission of the landing force.

4402. LANDING FORCE AVIATION TASKS

The landing force aviation commander is tasked with evaluating and submitting an initial estimate of landing force air support requirements. After his evaluation, he will prepare his initial estimate of the numbers and types of units to be employed. In preparing his estimate, he will consider the following:

a. Characteristics of the Area of Operations.--This includes all characteristics which will have an influence on possible courses of action. The factors are divided into two principle classes.

(1) General Factors.--A broad field which includes the impact of political, economic, and psychological conditions upon the conduct of friendly and enemy operations.

(2) Fixed Factors.--Stable characteristics in the area of operations. It is necessary to determine what limitations they impose or what advantages they may offer to the commander's force or those of the enemy. These characteristics include hydrography, terrain and topography, climate and weather, daylight and dark periods, locations and distances, lines of transportation and supply, health and sanitation conditions, usable facilities and fixed defenses, area communication facilities, and missile sites. Pertinent conclusions should be drawn in each case.

b. Relative Combat Power.--This includes an examination and comparison of opposing forces which covers communication and electronics capabilities, logistic support, and time and distance factors.

c. Factors of Environment and Relative Combat Power.--Having surveyed the environment, comparative resources, and his and the enemy's capabilities, the commander will find it useful to review the conclusions reached thus far. He must assess their possible impact by identifying deficiencies in information and sensitive areas of security, tabulating strength and weakness factors, and finally making the initial determination of the adequacy of his own force.

Section V. AVIATION ESTIMATE OF SUPPORTABILITY

4501. GENERAL

Preparation of an aviation estimate of supportability is the second step of the air support planning sequence. It is a special staff estimate prepared by, or under the cognizance of, the landing force tactical air commander. There is no set format for this estimate, and it may be presented verbally or in writing. Its purpose is to summarize significant aviation aspects of the situation as they might influence any course of action proposed, and to evaluate and determine how aviation units can best be employed to support the contemplated land force courses of action. The criteria for preparing and presenting the aviation estimate of supportability is found in FMFM 5-1, Marine Aviation.

Section VI. DETERMINING DETAILED AIR SUPPORT REQUIREMENTS

4601. GENERAL

A detailed estimate of air support requirements is made by the landing force aviation commander after the CLF has issued his concept of operations. It is made to ensure that adequate aviation resources are available for the operation. The CATF may require that landing force aviation participate in some or all of the ATF air support effort. Therefore, the landing force aviation commander may also participate in the determination of the estimate of air support requirements for the ATF. At this point in the planning sequence, the adequacy of air support means is measured to determine if sufficient aviation assets have been assigned to support all requirements. An example of a checklist of air support requirements is depicted in appendix B of FMFM 5-1, Marine Aviation.

a. In order that maximum benefits may be derived from aircraft in offensive air support, certain basic principles must be observed. Offensive air support should be requested when any one of the following factors is present:

(1) Air support is most suited for accomplishing the desired results, and/or other means of support are not available.

(2) Other means of support are incapable of accomplishing the results desired.

(3) The urgency of the situation requires that the fires of all supporting arms be brought to bear.

b. Such principles should be followed with an intelligent appreciation for the tactical situation. Aircraft should not be requested for targets which can be neutralized by other means. When requested air support is available, it should be used as soon as possible, rather than held on station, as it is more efficient to expend the armament, recover the aircraft, rearm, and be prepared to return on call.

4602. GROUND COMBAT ELEMENT OFFENSIVE AIR SUPPORT REQUESTS

Upon receipt of the CLF concept of operations, the ground combat element commander formalizes his air support requests. Close air support target lists are made, and on-call close air support requirements are predicted. When deriving his offensive air support requirements, the commander must consider the possibility of airspace saturation due to conflicting interests of other supporting arms and mutual interference of adjacent air missions. Thus a reasonable limit on the number of aircraft to be requested within a particular time frame must be imposed. Requests must reflect the anticipated threat (i.e., infantry, mechanized forces; artillery in the open, reveted, entrenched) to permit proper ordnance selection by the landing force aviation component.

4603. DETERMINATION OF REQUIREMENTS

a. Contents.--The detailed estimate of air requirements is a document of considerable value for the continuous planning of the amphibious operation. The landing force aviation commander incorporates in it his needs for offensive air support in terms of ordnance, fuel and other POL supplies, control agencies, personnel and equipment for support, and such other concerns as are appropriate. Specifically, the detailed estimate includes the following:

(1) Amount of offensive air support assets required by type (VMA, VMA(AW), VMA(AV-8), VMFA).

(2) Amount of bulk fuel necessary to support the operation.

(3) Amount of ordnance required by type.

(4) Amount of shipping and number of landing craft and amphibious vehicles required by type.

(5) Amount of special equipment required by type, organic and nonorganic.

b. Preparation.--Written estimates of air needs are prepared in a form similar to the estimate of supportability. The format generally follows the sequence of general requirement totals, pre-D-day, D-day, and post-D-day and other miscellaneous requirements affecting aviation.

Section VII. FORMULATION OF AIR PLANS

4701. GENERAL

Air plans reflect the nature of air operations, and centralized control dominates the planning phase. The basic uniformity of practice that promotes effectiveness in the conduct of operations is valuable, but it is not intended to restrict initiative or flexibility that may be necessary to meet the demands of each situation.

4702. AMPHIBIOUS TASK FORCE OPERATION PLAN

a. Development.--The chief distinction between various concepts devoped in the estimate of the situation and the development of the operation plan is that of precision. What is to be done, by whom, and when, is set forth in the amphibious task force plan. This plan should be clear, concise, complete, and authoritative in nature. It must convey positively the CATF's determination and intentions.

b. Format.--The format for the amphibious task force operation plan is found in NWIP 22-1, The Amphibious Task Force Plan. Of particular importance in the preparation of subordinate aviation unit plans are the air operations, antiair warfare, and amphibious operations (for ship-to-shore movement) annexes.

c. Responsibilities.--The CATF will identify the tasks to be performed by landing force aviation in order to:

(1) Attain and maintain air superiority in the objective area.

(2) Curtail or halt the movement of enemy forces into and within the objective area.

(3) Provide air control within the objective area.

(4) Conduct the helicopterborne ship-to-shore movement.

Section VIII. AVIATION COMBAT DOCUMENTS

4801. GENERAL

a. The operations of aviation elements in combat are governed principally by three types of documents: operation plans/orders, fragmentary orders, and standing operating procedures (SOP's).

b. The decentralized control in ground combat operations permits the division commander to issue an operation plan or order directed toward overall objectives. The detailed orders necessary to achieve those objectives will be issued by subordinate commanders. By contrast, the wing in combat does not move or displace toward an objective, rather it is moved ashore into more or less fixed physical locations. The combat tasks are performed principally by the aircraft which cover relatively large geographical distances in the performance of these tasks and, upon completion, return to these established installations. Air operations are planned and controlled centrally at the wing level and are affected by rapidly changing tactical situations and the daily requirements of supported ground forces.

4802. AVIATION UNIT OPERATION PLAN (OPLAN)

a. The aviation unit operation plan is a formal document. The five-paragraph format is typical. Attachments may appear as overlays, tables, computer printouts, or in other formats which promote ease of understanding; but the sophistication will vary with the time available for preparation. When the commander issues an order to execute, the operation plan normally is redesignated an operation order retaining its numerical identity.

b. The operation plan normally states the aviation mission in broad, general terms, such as "provide landward extension of the amphibious task force air defense system" or, "be prepared to assume control of air operations in the objective area." The wing operation plan also states the mission of its subordinate elements in similar general terms, providing broad guidance to groups and squadrons for relatively long periods of time. Detailed orders for the conduct of specific tasks are issued separately on a day-by-day basis during an operation.

c. The attachments to the OPLAN amplify, as is necessary, the basic plan. Appendix B provides an example of a basic OPLAN and selected annexes. Some of the annexes referred to below, or elsewhere in this publication, have universal applicability throughout the Marine Corps and, for that reason, are not shown in appendix B, but may be found in the appropriate Fleet Marine Force manual. Highlights of an aviation unit operation plan are found in the following annexes:

(1) Task Organization.--This annex provides the task organization of the aviation unit and a listing of support organizations.

(2) Intelligence.--This annex provides essential elements of information, target lists, weather studies, and the enemy order of battle.

(3) *Operations*.--This annex provides guidance for the conduct of chemical, nuclear, electronic warfare, search and rescue, and fire support coordination operations.

(4) *Logistics*.--The POL, munitions, and engineer support is shown in this annex.

(5) Rules of Engagement.--The rules of engagement for the conduct of offensive air support are defined in this annex.

(6) *Air Operations*.--This large annex provides information vital to the efficient conduct of offensive air support. It includes aircraft schedules, armament, close air support, interdiction, and armed reconnaissance, flak suppression, air refueling, escort and cover, AAW coordination, air control, and air communication procedures

(7) *Amphibious Operations*.--This annex provides the wing landing plan and will include landing information on the DASC, ASRT's, and other combat, control, and support activities as appropriate.

4803. FRAGMENTARY ORDER

a. After the operation plan/order is issued, it is necessary to amplify portions of the order daily. The necessary amplification is published as a combat order in fragmentary form. This fragmentary order is usually issued to cover successive 24-hour periods, although it can be issued in any periodic sequence, depending upon the situation. It is issued in sections with each group and independent squadron receiving its applicable section initially by electronic means and subsequently, by courier delivery of a complete copy.

b. There is no standard format for the frag order. The frag normally provides instructions, such as the mission or event number; assigns the numbers and type of aircraft for each event; specifies times on target or on station, communication frequencies and call signs, ordnance load, rendezvous points, and other coordinating instructions as required. A close examination of the contents of a wing frag order provides an excellent illustration of the detailed and centralized planning that is accomplished at the wing level. An example of a typical frag order is found in appendix C.

4804. STANDING OPERATING PROCEDURES

a. *External SOP's*.--Standing operating procedures are used extensively in Marine aviation. Examples are the Naval Air Training and Operating Procedures Standardization Program (NATOPS) manuals published for each aircraft which cover ground and normal flight procedures. Tactical manuals delineate the tactical employment procedures for the aircraft and augment the NATOPS. The purpose of such publications is to ensure uniformity of procedures among various types of aircraft, and among the various services. This, in turn, enhances the operational integration of all assigned aviation assets.

b. *Internal SOP's*.--As task organized entities, the Marine aircraft wings and groups differ in their organizational structure and internal operation. Therefore, extensive use is made of SOP's to provide procedural guidance for subordinate units in all areas of operations, administration, and other support.

c. Joint Formats.--JCS Pub 12, Volume II, Tactical Command and Control Procedures for Joint Operations, establishes standing procedures in the form of joint procedures and formats of importance to aviation units. Those utilized in offensive air support operations are reproduced as follows:

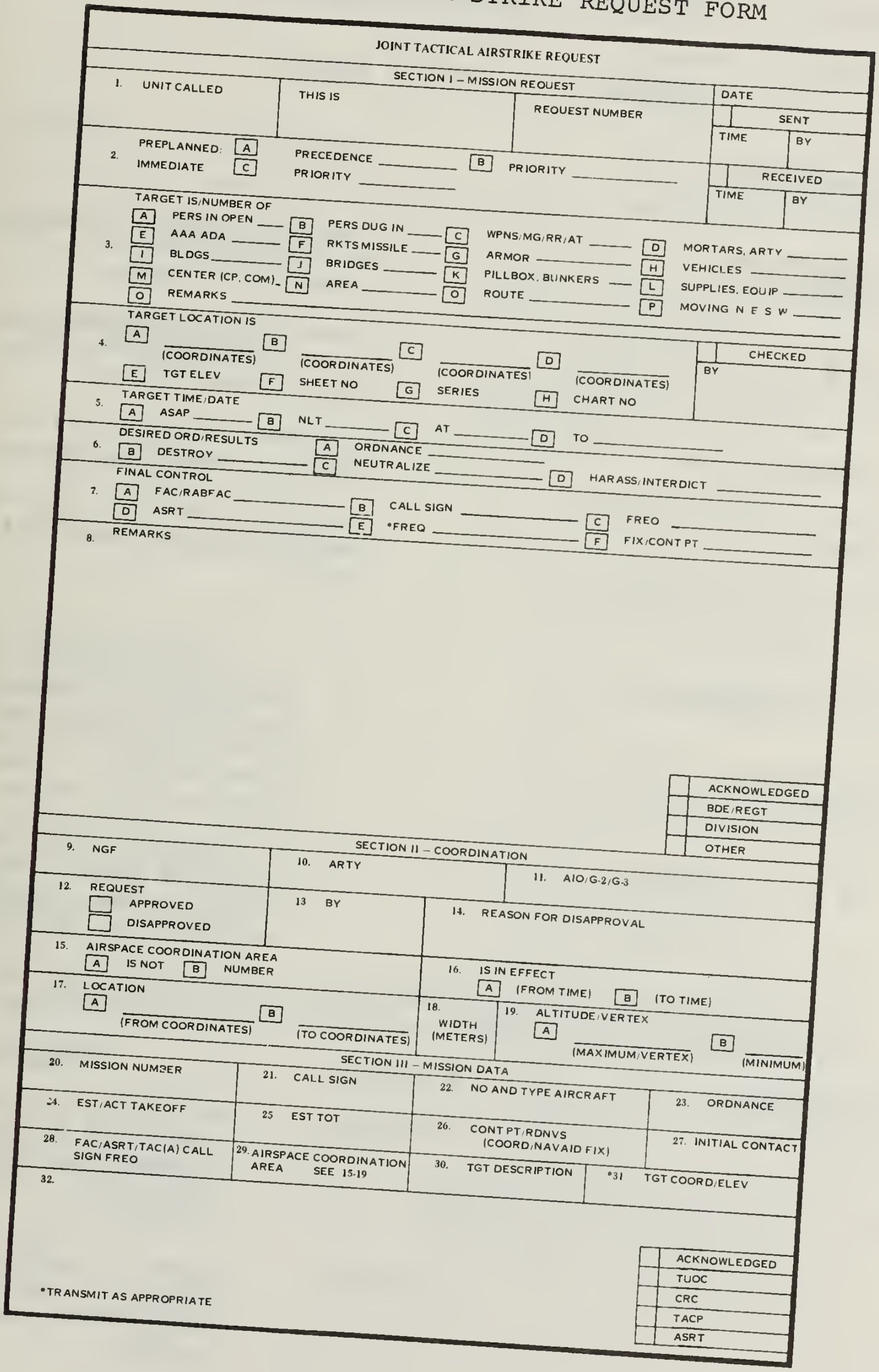
(1) Joint Tactical Air Strike Request in appendix A.

(2) Joint Air Strike Mission Data/Report (Close Air Support/ Air Interdiction) in appendix D.

(3) Mission Report in appendix E.

APPENDIX A

JOINT TACTICAL AIR STRIKE REQUEST FORM



JOINT TACTICAL AIRSTRIKE REQUEST

SECTION I – MISSION REQUEST

1. UNIT CALLED | THIS IS | REQUEST NUMBER

DATE

☐ SENT — TIME — BY

☐ RECEIVED — TIME — BY

2. PREPLANNED: A — IMMEDIATE C — PRECEDENCE ______ PRIORITY ______ — B PRIORITY ______

3. TARGET IS/NUMBER OF
- A PERS IN OPEN ___
- E AAA ADA ___
- I BLDGS ___
- M CENTER (CP, COM) ___
- O REMARKS ___
- B PERS DUG IN ___
- F RKTS MISSILE ___
- J BRIDGES ___
- N AREA ___
- C WPNS/MG/RR/AT ___
- G ARMOR ___
- K PILLBOX, BUNKERS ___
- O ROUTE ___
- D MORTARS, ARTY ___
- H VEHICLES ___
- L SUPPLIES, EQUIP ___
- P MOVING N E S W ___

4. TARGET LOCATION IS
- A ______ (COORDINATES)
- B ______ (COORDINATES)
- C ______ (COORDINATES)
- D ______ (COORDINATES)
- E TGT ELEV
- F SHEET NO
- G SERIES
- H CHART NO

☐ CHECKED — BY

5. TARGET TIME/DATE — A ASAP ______ B NLT ______ C AT ______ D TO ______

6. DESIRED ORD/RESULTS — B DESTROY ______ A ORDNANCE ______ C NEUTRALIZE ______ D HARASS/INTERDICT ______

7. FINAL CONTROL — A FAC/RABFAC ______ B CALL SIGN ______ C FREQ ______ D ASRT ______ E *FREQ ______ F FIX/CONT PT ______

8. REMARKS

☐ ACKNOWLEDGED
☐ BDE/REGT
☐ DIVISION
☐ OTHER

SECTION II – COORDINATION

9. NGF | 10. ARTY | 11. AIO/G-2/G-3

12. REQUEST ☐ APPROVED ☐ DISAPPROVED | 13 BY | 14. REASON FOR DISAPPROVAL

15. AIRSPACE COORDINATION AREA — A IS NOT — B NUMBER

16. IS IN EFFECT — A (FROM TIME) — B (TO TIME)

17. LOCATION — A ______ (FROM COORDINATES) — B ______ (TO COORDINATES)

18. WIDTH (METERS)

19. ALTITUDE/VERTEX — A ______ (MAXIMUM/VERTEX) — B ______ (MINIMUM)

SECTION III – MISSION DATA

20. MISSION NUMBER | 21. CALL SIGN | 22. NO AND TYPE AIRCRAFT | 23. ORDNANCE

24. EST/ACT TAKEOFF | 25 EST TOT | 26. CONT PT/RDNVS (COORD/NAVAID FIX) | 27. INITIAL CONTACT

28. FAC/ASRT/TAC(A) CALL SIGN FREQ | 29. AIRSPACE COORDINATION AREA SEE 15-19 | 30. TGT DESCRIPTION | *31 TGT COORD/ELEV

32.

☐ ACKNOWLEDGED
☐ TUOC
☐ CRC
☐ TACP
☐ ASRT

*TRANSMIT AS APPROPRIATE

APPENDIX A

INSTRUCTIONS FOR USE OF THE JOINT TACTICAL AIR STRIKE REQUEST FORM

Section I.--(MISSION REQUEST)

Title and Element(s)	Explanation
Line 1. Unit called (Identifier)	1. Identifies the unit called by unit designation/call sign/ preassigned number.
This is (Identifier)	Identifies the request originator by unit designation/call sign/ preassigned number.
Request number	Indicates the originator's request number in series.
Sent	Indicates the time and the individual who transmitted the request.
Line 2.	2.
A. Precedence	A. For preplanned requests, indicates the requester's assignment relative to his other requests stated numerically in descending order of importance.
B & C. Priority	B & C. Use numerical designation below to define the tactical situation for preplanned (B) or immediate (C) request.

Priority--It is the responsibility of the requester to establish the priority. The categories of mission priority are:

Priority No.	Priority	Definition
1	Emergency	Targets which require immediate action and precedence over all other categories of mission priority.
2	Priority	Targets which require immediate action and take precedence over routine target.

Title and Element(s)	Explanation	
Priority No.	Priority	Definition
3	Routine	Targets of opportunity, targets which do not demand urgency in execution.
Received		Indicates the time and the individual who received the request.
Line 3. Target is/Number of	3. Describes the type, approximate size, mobility of the target to be attacked.	
Line 4. Target Location is	4. Locates the target by using the military grid reference system prescribed for the area concerned.	
A. Coordinates	A. Locates a point target or starting point.	
B. Coordinates	B. When used in conjunction with A, provides from ______ to ______ coordinates.	
C. Coordinates	C. When used in conjunction with A and B, provides a route.	
D. Coordinates	D. When used in conjunction with A through C, provides a route or describes a target area.	
E. Target Elevation	E. Target elevation in feet above sea level.	
F. Sheet No. ____	F. Self-explanatory.	
G. Series ____	G. Self-explanatory.	
H. Chart No.	H. Self-explanatory.	
Checked	Indicates with whom target information has been cross-checked.	
Line 5. Target Time/Date	5. Indicates the time/date when the airstrike is requested.	
A. ASAP	A. As soon as possible.	

Title and Element(s)	Explanation
B. NLT	B. The target is to be attacked before, but not later than the time indicated.
C. At	C. Indicates time at which target is to be attacked.
D. To	D. Denotes end of period of time in which support such as airborne alert or column cover is required. When used with Item C, use of Item B is unnecessary.
Line 6. Desired Ordnance/results	6. Indicates the requester's desired ordnance airstrike results.
A. Ordnance	A. Self-explanatory.
B. Destroy	B. Self-explanatory.
C. Neutralize	C. Self-explanatory.
D. Harass/Interdict	D. Self-explanatory.
Line 7. Final Control	7. Identifies the final controller (FAC), radar beacon FAC (RABFAC), TAC(A), ASRT who will conduct the attack briefing and control the release of ordnance.
A. FAC, TAC(A)	A. Self-explanatory.
B. Call sign	B. Self-explanatory.
C. Freq--Pri/Sec	C. Self-explanatory.
D. ASRT/RABFAC	D. Self-explanatory.
E. Freq--Pri/Sec	E. Self-explanatory.
F. Fix/Cont Pt	F. Military grid coordinates or navigational aid fix of a control point which is the furthest limit of an attack aircraft's route of flight prior to control by the final controller.

NOTE: This block may not apply to air interdiction missions.

Title and Element(s)	Explanation
Line 8. Remarks	8. Allows for the incorporation of other essential information not provided for in the request format.
Acknowledged Bde/Regt Division Other	Acknowledged indicates that the request has been copied for concurrence at brigade/regiment, division, and higher echelon. (Applies only to requests by ground forces.)

Section II.--(COORDINATION)

Title and Element(s)	Explanation
Line 9. NGF	9. Naval gunfire coordination.
Line 10. ARTY	10. Artillery coordination.
Line 11. AIO/G-2/G-3	11. Air Intelligence Officer, G2, G3, or other Service equivalent coordination.
Line 12. Request A. Approved B. Disapproved	12. Indicates the approval or disapproval of the request.
Line 13. By	13. Indicates the individual who approved or disapproved the request.
Line 14. Reason for disapproval	14. Self-explanatory.
Line 15. Airspace Coordination Areas A. Is not in effect B. Number	15. Safety measures for friendly aircraft. The airspace coordination area establishes airspace that is reasonably safe from friendly, surface-delivered, nonnuclear fires. A plan number is issued, as appropriate.
Line 16. Is in Effect A. From time B. To time	16. Establishes the time period that the applicable plan will be in effect.

Title and Element(s)	Explanation
Line 17. Location	
A. From--coordinates	A. Military grid coordinates by bearing and distances from a known navigation aid.
B. To--coordinates	
Line 18. Width (meters)--from either side of the centerline defined by the above coordinates.	
Line 19. Altitude/VERTEX (use subitem A for VERTEX only entry).	
A. Maximum/VERTEX	Given in mean sea level (MSL) altitude; altitude above sea level.
B. Minimum	

Section III.--(MISSION DATA)

Line 20. Mission Number	20. Indicates mission number.
Line 21. Call sign	21. Flight call sign of mission aircraft.
Line 22. No. and Type Aircraft	22. Self-explanatory.
Line 23. Ordnance	23. Type of ordnance either by code number or actual nomenclature.
Line 24. Est/Act Takeoff	24. Estimated or actual time the mission aircraft will take off.
Line 25. Est TOT	25. Estimate time on target.
Line 26. Cont Pt/RDNVS (Coord/ NAVAID FIX)	26. The furthest limit of the attack aircraft's route of flight prior to control by the final controller. It should be the same as Line 7, Item F, when designated in the request.
Line 27. Initial Contact	27. Indicates the initial control agency the flight is to contact.
Line 28. FAC/ASRT/TAC(A) Call Sign Freq	28. Call sign of final control agency and frequency.
Line 29. Airspace Coordination Area	29. Refer to Blocks 15 through 19 for this data.
Line 30. Tgt Description	30. Self-explanatory.
Line 31. Tgt Coord/Elev	31. Self-explanatory.

NOTE: Section III mission data information transmitted to the requesting agency may be limited to those items not included in the request.

APPENDIX B

EXAMPLES OF SELECTED ATTACHMENTS TO AN OPERATION PLAN

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TAB A (Air Fire Support) to APPENDIX 12 (Fire Support) to ANNEX C (Operations) to 4th MAW OPLAN 9999 (U)

(U) Ref: (a) 4th MARDIV OPLAN 9999 (U)
(b) IV MAF/CTF-65 OPLAN 9999 (U)
(c) FMFM 7-1, Fire Support Coordination
(d) FMFM 5-4, Offensive Air Support

1. (U) GENERAL

a. Purpose..--The purpose of this tab is to provide a graphic illustration of the preplanned airstrikes scheduled in direct support of the 4th MARDIV scheme of maneuver (see reference (a)). This tab also appears in Appendix 12, Annex C, references (a) and (b), joining similar tabs for artillery and naval gunfire to reflect the fire plans of all supporting arms within the framework of a single document.

b. Scope.--Enclosures 1 through 3 of this tab reflect all prearranged air fire to be furnished by LFA within the 4th MARDIV area of responsibility on D-day, including on-call and on-station aircraft.

c. Definitions.--Standard definitions as listed in references (c) and (d) will be used. The following are essential:

(1) Preplanned Air Support.--Air support in accordance with a program planned in advance of operations.

(2) Prearranged Fire.--Fire that is formally planned and executed against targets or target areas of known location ... and is executed at a predetermined period of time.

(3) On-Call.--The term used to signify that a prearranged concentration, airstrike, or final protective fire may be called for.

(4) Call Mission.--A type of air support mission which is not requested sufficiently in advance of the desired time of execution to permit detailed planning and briefing of pilots prior to takeoff. Aircraft scheduled for this type of mission are on air, ground, or carrier alert, and are armed with a prescribed load. Call missions respond to immediate mission requests.

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(5) Direct Air Support.--An air support mission requiring an aviation combat element to support a specific ground combat element and authorizing it to answer directly to a request for assistance. Direct air support includes close air support, air reconnaissance, and assault support missions; each must be coordinated with the supported ground commander and executed within his area of responsibility.

(6) Area of Responsibility.--The area of responsibility is that delineated area of terrain in which an infantry commander can deploy his troops (including patrols) and can engage targets without specific approval or clearance from higher headquarters. The ground combat element commander has absolute control of the terrain and airspace encompassed by his area of responsibility boundaries.

2. (U) CONCEPT OF AIR FIRE SUPPORT

Landing force aviation (LFA) provides air fire in direct support of 4th MARDIV amphibious assault. Each unit of the ground combat element prepares a plan for air fire support to compliment naval gunfire and artillery fire plans. This plan represented the ground unit's initial request for air fire support to be delivered in the ground unit's area of operations; initial requests were forwarded via the chain of command for analysis modification, approval, and incorporation into the fire support plan for each succeeding ground unit. Upon approval by the CLF, each ground unit prepares an Air Fire Support Tab (Tab A, Appendix 12 to Annex C). It includes all preplanned airstrikes to be furnished that unit, whether from LFA or other air elements supporting the amphibious task force.

3. (U) CONDUCT OF AIR FIRE SUPPORT

a. Pre-D-Day Air Fire.--Landing force (TF-65) requirements for pre-D-day air operations concern primary intelligence needs and fire support to reduce the enemy's ability to withstand the amphibious assault. LFA (TG-65.3) conducts pre-D-day air operations in accordance with Tab A, Appendix 7, Annex P.

b. D-Day Air Fire.--LFA provides air fire in direct support of 4th MARDIV, in accordance with enclosures (1) through (3):

(1) Aircraft deliver prearranged fire for pre-H-hour neutralization of landing beaches and helicopter landing zones.

(2) Commencing H-hour, conducts close air support by delivering prearranged fire, both scheduled and on-call, against targets selected for destruction.

(3) LFA aircraft scheduled for close air support call missions are listed in enclosure (1) to this tab.

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c. Post-D-Day Air Fire.--Air fire in direct support of 4th MARDIV in accordance with Tabs C and D, Appendix 2, Annex M and daily frag orders.

d. Coordinating Instructions

(1) Pre-H-hour airstrikes directed by TAC(A). Airborne forward air controllers mark targets as required.

(2) As FAC's become operational ashore, they will originate all requests for on-call airstrikes within the fire support coordination line.

(3) FSCL's as delineated; enclosure (3) to this tab.

(4) Immediate mission requests will be received by the TACC, referred to the fire support coordinator, and the supporting arms coordinator. Call mission aircraft will be assigned as appropriate.

(5) Airspace coordination areas and general safety procedures as set forth in Appendix 2, Annex M.

4. ( ) ADMINISTRATION AND LOGISTICS

a. Administration

(1) BDA reports received by TAC(A), AFAC's, and flight leaders will be submitted in accordance with paragraph 4, Annex M.

(2) Any changes or modifications to Enclosures (1) through (3) of this tab will be directed by frag order.

b. Logistics.--See Annex D.

5. ( ) COMMAND AND SIGNAL

a. TAC(A) call sign: PLAYBOY.

b. FAC position marking: Red smoke plus mirror signal on request.

c. Code word for mirror signal: EIGHTBALL.

d. Emergency signal to lift airstrike: Green star cluster.

e. Emergency code word to lift airstrike: BEATNIK, acknowledge.

Enclosures:
1 - Preplanned Close Air Support
2 - Air Targets
3 - Air Target Overlay

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ENCLOSURE 1 (Preplanned Close Air Support) to TAB A (Air Fire Support) to APPENDIX 2 (Fire Support) to ANNEX C (Operations) to Operation Order 19-7.

	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
LN #	TGT #	TYPE MSN	AIRCRAFT ORDNANCE	TOT/ TIME ON STA	ATK DIR	PULL OUT DIRECTION	TGT MARKING	CONTROL AGENCY	REMARKS
1	AZ 0001	PREP	VMA 10 KT	H-25	090°	-	-	DASC	BRIEFING AND CONTROL PTS BY LF AIR
2	AA 9001	PREP	VMA WETEYE GB	H-25	040°	-	-	DASC	-do-
3	AZ 9029	CAS	VMA SPRAY VX	GND ALERT ON CALL H-60 to H+60	090°	-	-	DASC	-do-
4	AZ 9031	CAS	VMA SPRAY VX	AIR ALERT ON CALL H-25 to H+10	100°	-	-	DASC	-do-
5	XZ 2003	CAS	VMA 500 GP RKT/20MM	H-2 HRS	045°	-	RKT	TAC(A)	TAC(A) MARKS CTR TGT W/RKTS
6	AB 3536	CAS	VMA NAPALM 20MM	H-5 to H+5	090°	-	WP	FAC	NGF MARKS ON REQ FLT LDR
7	AB 1261	CAS	VMA NAPALM SNAKE EYE	H-4	060°	-	YELLOW SMOKE	FAC	ARTY MARKS ON REQ FLT LDR
8	XZ 2005	CAS	VMA 500 GP RKT/20MM	H-HOUR	070°	-	RKT	TAC(A)	TAC(A) MARKS CTR TGT W/RKTS

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ENCLOSURE 2 (Air Targets) to TAB A (Air Fire Support) to APPENDIX 2 (Fire Support) to ANNEX C to Operation Order 19-7.

LN #	(a) TGT #	(b) TGT DESCRIPTION	(c) TGT COORD-UTM	(d) SIZE (METERS)	(e) DIRECTION/DISTANCE FRIENDLY UNITS	(f) SOURCE	(g) REMARKS
1	AZ 0001	RKT LCHR	2660 1790	PT TGT	170°/-	II-100	HEAVY FOLIAGE
2	AA 9001	INF ASSY AREA	248 128	2000X 1000	180°/2000	AO-100	IMMEDIATE CASUALTIES
3	AZ 9029	INF ASSY AREA	279 128	1200X 800	175°/2000	AO-100	IMMEDIATE CASUALTIES CONTAMINATE AREA
4	AZ 9031	INF ASSY	2590 1350 TO 2620 1350	2300X 500	190°/3500	AOO-100	-do-
5	XZ 2003	AA RADAR SITE	249 168	PT TGT	140°/6500M	II-50	IF NOT DESTROYED BY AIR, NGF WILL ATK
6	AB 3536	TRENCH W/MG	290 116	100X 2200	180°/500M	OP-50	SKED BY NGF
7	AB 1261	AW BUNDER	270 115	PT TGT	180°/500M	AO-100	SKED BY ARTY
8	XZ 2005	FROG 2 SITE	2950 1750	200X 200	180°/7000M	II-50	IN DEFILADE

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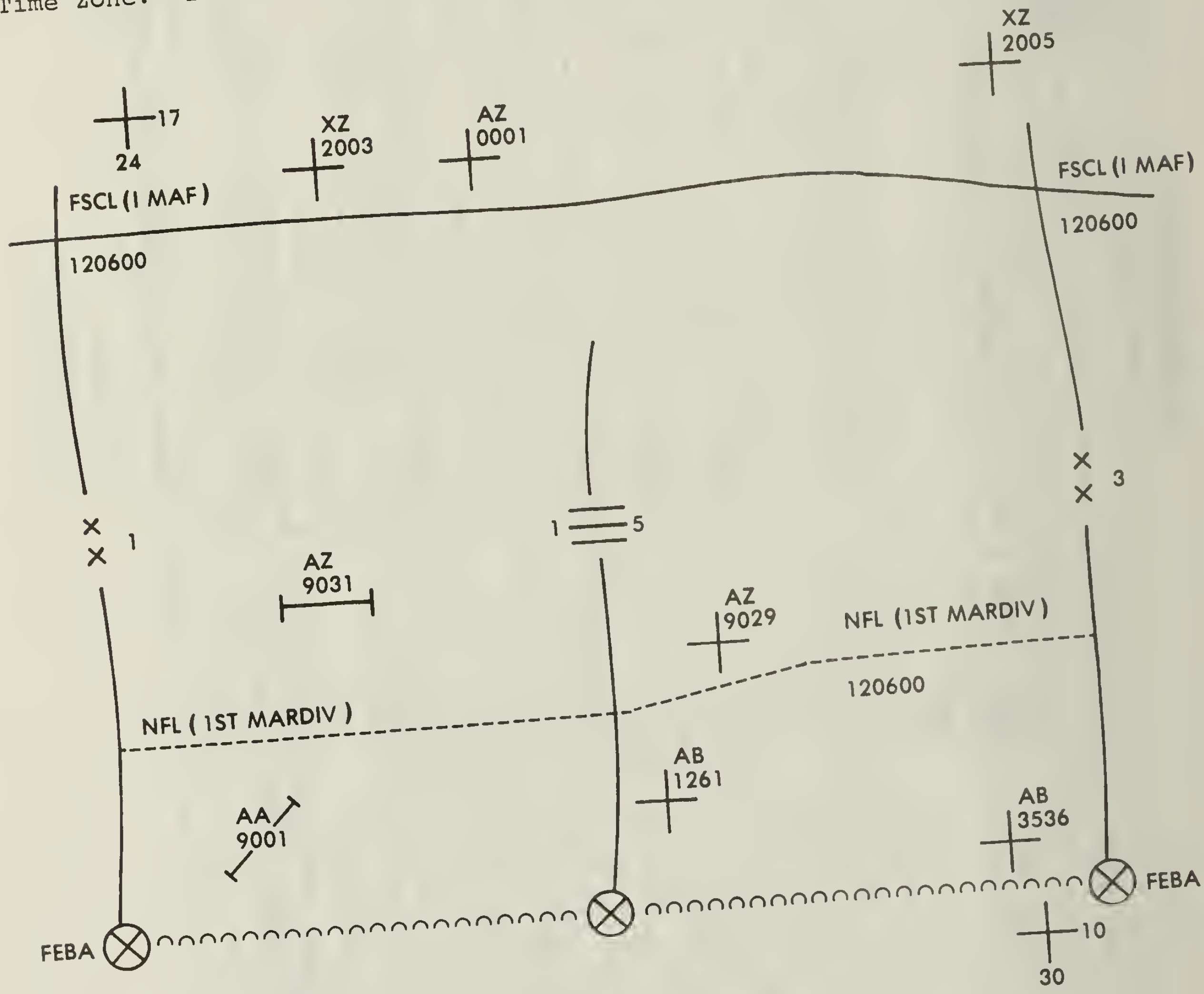
ENCLOSURE 3 (Air Target Overlay) to TAB A (Air Fire Support) to APPENDIX 2 (Fire Support) to ANNEX D (Operations) to Operation Order 19-7.

Ref: (a) Map: Series J741, Sheets II, III

Time Zone: Zulu



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ENCLOSURE 1 (Aircraft Availability Form) to TAB D (D+2 On-Aircraft Schedules) to APPENDIX 7 (Aircraft Schedules) to ANNEX M (Air Operations) to OPLAN ______(U)

1. The format below is an example of how aircraft availability should be summarized. This form will be submitted by MAG commanders to the MAW operations and is an estimate of aircraft available for the day following the day of submission. The time at which such forms are to be submitted will be established by the wing commander, but it must be soon enough to provide planning information in scheduling the next day's operations, probably in the very early evening.

AIRCRAFT AVAILABILITY FORM

Period Covered (date/time group) to (date/time group)

Type Aircraft	Number of Aircraft	Aircraft Availability	Authorized Daily Sortie Rate	Total Sorties Available At One Time	Total Sorties Available 24 Hours	Remarks
F-4	24	65%	1.2	15	28	-

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TAB A (Armament Codes) to APPENDIX 6 (Armament) to ANNEX M (Air Operations) to OPLAN ________ (U)

( ) References:

1. Experience has shown that it is expedient to establish armament codes to designate not only individual weapons, but specific aircraft ordnances mixes as well. Such codes provide both a modicum of secrecy and an economy of language which is especially important in aviation; radios are tied up for relatively shorter periods of time when flights check in ordnance codes to FAC's or TAC(A)'s rather than by specific numbers and types of ordnance. It is also much easier for planners to call for an ordnance mix by a coded word. Once a planner knows the nature of the target or the probable target, he consults his tables of available ordnance and the Joint Munitions Effectiveness Manuals and designates the appropriate load for the aircraft.

2. There are no set armament codes; the system established is arbitrary. In Vietnam, the "Delta" code was created as the word designator for individual airborne weapons. A Delta-1, was a 250 pound, low drag bomb; a Delta-2 was a 500 pound low drag, etc. To designate specific ordnance mixes, the names of American cars were employed. For instance, the code word "Buick" might mean one napalm tank, ten 500-pound bombs, and 20mm cannon.

3. The enclosures of Tab B of this appendix will, when filled in, show the armament load codes established by the planners for an air OPLAN.

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APPENDIX 2 (Air Support) to ANNEX M (Air Operations) to ______
OPLAN ______ (U)

( ) References: Maps (Should have military grid reference system.)

1. ( ) GENERAL

This appendix addresses the delivery of ordnance in support of ground combat elements within the geographic limits imposed by the fire support coordination line.

2. ( ) CONCEPT

Delineate concept of close air support (numbers of sorties available for preplanned and alert missions, number of aircraft in normal flight, integration with other fire support means, types of targets to be assigned CAS, etc).

3. ( ) CONDUCT

a. Priorities.--Address means/methods for establishing priorities in assigning targets to CAS aircraft and in assigning air support to specific units.

b. Air Requests

(1) Preplanned.--Address method for processing preplanned CAS requests at appropriate level.

(2) Immediate.--Address method for processing immediate CAS requests at this command level, be it requesting or authorizing and ordering.

c. Tactical Air Control Procedures.--In accordance with Tab A to this appendix.

d. AFAC Procedures.--In accordance with Tab B to this appendix.

e. BDA Reporting Procedures.--In accordance with Tab C to this appendix.

f. Target Marking for Air Attack.--In accordance with Tab D to this appendix.

g. Air Support Radar Team Procedures.--In accordance with Tab E to this appendix.

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h. Aircraft Alert Status

(1) Alert Conditions for CAS Aircraft

CONDITION	STATUS	ARMAMENT

(2) Alert Stations for Aircraft.--Define airborne alert stations.

i. Aircraft Armament

(1) Loads as specified by daily fragmentary orders. Unless otherwise stated, all loads include full internal armament.

(2) Pilots include numbers of each type of ordnance carried when making armament reports.

(3) Armament codes in accordance with Tab A to Appendix 6 to this annex.

j. Attack Limitations.--Provide specific guidance for air attacks reflecting enemy antiair threat, anticipated weather interference, terrain clearance minimums for night operations, etc. as appropriate.

4. ( ) ADMINISTRATION AND LOGISTICS

a. Administration.--Address consolidation and forwarding of preplanned air requests, BDA reports, etc. as appropriate. Aircraft availability and schedules in accordance with Appendix 7 to this annex.

b. Logistics.--Designate source of supply for RABFAC beacons, laser designators, landing zone marking lights, panels, marking smoke, etc., as appropriate.

5. ( ) COMMAND AND SIGNAL

a. Command Relationships.--Define authority to request, approve, countermand, and/or modify divert close air support missions.

b. Signal.--Air-to-ground signals in accordance with Tab F to this appendix. Refer to appropriate element of plan for instructions, i.e., Tab D to Appendix 1 to Annex K for frequency assignments. At battalion level, it may be desirable to list appropriate frequencies in this subparagraph.

TABS:

A	Tactical Air Control
B	Airborne Forward Air Controller Procedures
C	Bomb Damage Assessment Reporting Procedures
D	Target Marking for Air Attack
E	Air Support Radar Teams Procedures
F	General Instructions and Safety Procedures

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TAB A (Tactical Air Control Procedures) to APPENDIX 2 (Air Support) to ANNEX M (Air Operations) to _____ OPLAN _____ (U)

( ) References:

1. ( ) GENERAL

Tactical air control procedures are provided for guidance to appropriate agencies in the air control chain. Primary emphasis will be placed on control during the delivery phase of the evolution.

2. ( ) CONCEPT

General concept is that close air support will always be conducted under positive control to ensure accuracy of delivery and troop safety.

3. ( ) CONDUCT

a. Sequencing.--Control sequencing will be from DASC to delivery controller (FAC, FAC(A), AFAC, ASRT) back to DASC.

b. Briefing.--Pilots will be briefed on missions by DASC while inbound to target area utilizing mandatory items for CAS as depicted on Enclosure (1) to Tab A to this appendix. Remainder of items, as appropriate, will be briefed by the terminal delivery controller. Additionally, FAC's FAC(A)'s, and AFAC's will brief pilots on wind conditions, flight or navigation hazards, target marking methods, and will repeat such items as have been briefed by DASC as are appropriate.

c. Orbit Points.--Define orbit points for CAS aircraft or refer to Tab B, Appendix 14 to this annex. State agency authorized to clear aircraft from orbit point to target.

d. Contact Points.--Define position at which mission leader makes initial radio contact with the forward air controller.

e. Target Marking.--In accordance with Tab D to this appendix.

f. Marking Friendly Positions.--Friendly positions will be marked by panel/smoke mirror, light, etc. Under no circumstances will pilots deliver ordnance when the position of friendly forces is in question.

g. Delivery

(1) Methods.--Establish the authority for determining fusing selections, dive angles, number of drops per run, number of runs, etc.

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(2) Clearance.--Establish methods to be used to clear aircraft to drop ordnance.

(3) Corrections.--Delivery correction methods must be defined (normally in meters on a clock code relative to the run-in line). If the enemy threat dictates multiple run-in headings, an alternate must be provided.

h. Exit Routes.--Self-explanatory.

4. ( ) ADMINISTRATION AND LOGISTICS

a. Administration.--BDA reports in accordance with Tab C to this appendix.

b. Logistics

5. ( ) COMMAND AND SIGNAL

a. Command

b. Signal

(1) No radio instructions.

(2) Emergency signal to lift airstrike.

(3) Emergency code to lift airstrike.

ENCLOSURES:

1 Tactical Air Request Form
2 Forward Air Controller Party Instructions

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ENCLOSURE 1 (Tactical Air Request Form) to TAB A (Tactical Air Control Procedures) to APPENDIX 2 (Air Support) to ANNEX M (Air Operations) to ______ OPLAN ______ (U)

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ENCLOSURE 2 (Forward Air Controller Party Instructions) to TAB A (Tactical Air Control Procedures) to APPENDIX 2 (Air Support) to ANNEX M (Air Operations) to _____ OPLAN _____ (U)

( ) Ref: (a) FMFM 5-4
(b) FMFM 5-3
(c) NWIP 22-2

1. ( ) GENERAL

FAC parties serve as extensions of the air control system to advise and assist the ground commander on air support operations.

2. ( ) CONCEPT

FAC parties will be employed as instructed by the ground commander. (Ground commander will state manner in which FAC parties are to be employed.)

3. ( ) CONDUCT

a. Air Requests

(1) Preplanned.--Preplanned requests will be submitted to ________ via ________ using ________ method.

(2) Immediate.--Immediate requests will be submitted directly to the DASC on the TAR net. Battalion (regiment and division TACP's will monitor and approve by remaining silent and countermand or modify by ________________.

(3) Format.--Close air support requests will be submitted in accordance with the format provided in Enclosure 1 to Tab A to this appendix. Forms will be completed in accordance with instructions contained in reference (a).

b. Armament Codes.--Armament codes in accordance with Tab A to Appendix 2 to this annex will be used for all air support requests and briefings.

c. Marking Friendly Positions.--Ensure that friendly positions/ locations are clearly marked as defined in accordance with instructions contained in references (a) and (b) or Tab A to this appendix.

d. Air Control Procedures.--In accordance with Tab A to this appendix.

e. Target Marking Procedures.--In accordance with Tab D to this appendix.

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TAB B (Airborne Forward Air Controller Procedures) to APPENDIX 2 (Air Support) to ANNEX M (Air Operations) to _____ OPLAN _____ (U)

( ) Ref: (a) FMFM 5-4, Offensive Air Support
(b) FMFM 5-3, Assault Support

1. ( ) GENERAL

AFAC's serve as extensions of the air control system to control airstrikes in support of the ground commander. They may also control artillery and naval gunfire if conditions warrant such assistance.

2. ( ) CONCEPT

AFAC's employment to be outlined. Normally, they shall be used to assist the TACP's in controlling airstrikes against targets which cannot be observed by ground FAC's. They may also serve as extensions of the TACC in the control of airstrikes beyond the FSCL. Numbers airborne and range of operations must be outlined.

3. ( ) CONDUCT

a. Air Requests.--Air requests generated by AFAC's will normally be immediate requests. Although AFAC's may control both immediate and preplanned, requests are normally generated from the analysis of the AFAC debrief rather than direct requests submitted by the AFAC.

(1) Priorities.--Establish guidance for the assignment of priorities to air requests submitted by AFAC's.

(2) Submission.--Establish method of submitting immediate air requests by AFAC's. Normally, missions within FSCL will go to DASC, beyond FSCL will to to TACC or should radio relay range require it, to TAC(A).

(3) Format.--Close air support requests will be submitted in accordance with the format provided in Enclosure 1 to Tab A to this appendix. Forms will be completed in accordance with the instructions contained in reference (a).

b. Armament Codes.--Armament codes in accordance with Tab A to Appendix 2 to this annex will be used for all air support requests and briefings.

c. Marking Friendly Positions.--Ensure that friendly positions/locations are clearly marked in accordance with instructions contained in references (a) and (b) or Tab A to this appendix. If targets

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are greater than _____ meters from nearest friendly positions, then friendly positions need not be specifically defined or marked.

d. Air Control Procedures.--In accordance with Tab A to this appendix.

e. Target Marking Procedures.--In accordance with Tab A to this appendix.

f. BDA Reporting Procedures.--In accordance with Tab C to this appendix.

g. Air Raid Warnings.--Monitor TAR net for air defense warning conditions. (Local action and dissemination of information in accordance with Appendix 4 to Annex Q.)

h. FAC(A).--Provide guidance for employment of FAC in an airborne with Tab F to Appendix 2 to this annex.

i. Coordinating Instructions

(1) External.--Fire support coordination will be in accordance with Tab F to Appendix 2 to this annex.

(2) Internal.--Ground commander provides instructions for coordination of his air fire support with his organic weapons such as mortars, etc.

4. ( ) ADMINISTRATION AND LOGISTICS

5. ( ) COMMAND AND SIGNAL

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TAB C (Bomb Damage Assessment Reporting Procedures) to APPENDIX 2 (Air Support) to ANNEX M (Air Operations) to _____ OPLAN _____ (U)

( ) Ref:

1. ( ) GENERAL

BDA reports will be made in conjunction with all close air support missions to provide an instant means of assessing the need for additional fire on the target(s).

2. ( ) CONCEPT

BDA reports will be provided by the FAC, FAC(A), or AFAC to the flight leader for each close air support mission. The flight leader, in turn, provides the report to the appropriate air control agency DASC or TACC as required.

3. ( ) CONDUCT

a. Evaluation.--Upon completion of airstrikes, controllers will make evaluations of damage inflicted on enemy forces.

b. Reporting

(1) By FAC's and FAC(A)'s. (Prescribe report channels for each, i.e., to pilots, DASC, TACC, ground commander, etc.)

(2) By AFAC's. (Prescribe report channels for each, i.e., to pilots, DASC, TACC, ground commander, etc.)

c. Items Reported.--Each report will evaluate or identify the following:

(1) Target (number, coordinates, and type).

(2) Time (on and off target).

(3) Ordnance expended. Self-explanatory.

(4) Target damage. (Completely/partially destroyed/neutralized, unknown, etc. terms to be utilized, must be defined herein.)

(5) Enemy action. (None to heavy, type weapons, ground or air, etc. terms to be utilized must be defined herein.)

(6) Remarks. Self-explanatory.

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TAB D (Target Marking for Air Attack) to APPENDIX 2 (Air Support) to ANNEX M (Air Operations) to _____ OPLAN _____ (U)

( ) Ref:

1. ( ) GENERAL

Target marking for air attack is a necessity to ensure accuracy of delivery and safety of friendly forces. Methods vary with resources available. Enemy camouflage is excellent, making detection difficult, etc.

2. ( ) CONCEPT

Define the concept for the marking of close air support targets. The methods and timing outlined must recognize the enemy threat and reaction capabilities as well as the means available to friendly forces.

3. ( ) CONDUCT

a. Target Designation

(1) Map Coordinates.--Give degree of coordinates (8-digit) definition required, maximum safe distance from friendly forces for use of this method, etc.

(2) Geographic Location.--Distance and direction from a known landmark or natural feature, also called reference point method. Define limits for this type control.

(3) Panel Method.--Panels displayed in a "T" aligned with the target along the run-in line so that pilot overflies panels on run-in to target. Define dimensions and/or restrictions to use.

(4) Observing and Directing.--FAC "talking pilot in." This involves corrections in the run-in to target.

b. Target Marking

(1) Artillery.--Define types of marking methods and request procedures.

(2) Naval Gunfire.--Define types of marking methods and request procedures.

(3) Air.--Define types of marking to be used.

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(4) Mortars.--Define types of marking methods and request procedures.

(5) Tanks.--Define types of marking methods and request procedures (of particular importance in motorized/mechanized operations).

(6) Machineguns.--Intersecting fires of particular value in dusk or night operations. Define methods to be used.

(7) Illumination.--Define types of illumination to be used and request procedures.

(8) RABFAC Beacon.--In accordance with Enclosure 1 to this tab.

(9) Laser Designation.--In accordance with Enclosure 2 to this tab.

c. Coordination.--Define coordination of marking means with air support aircraft to ensure safety.

4. ( ) ADMINISTRATION AND LOGISTICS

a. Administration

b. Logistics

5. ( ) COMMAND AND SIGNAL

a. Command

b. Signal

ENCLOSURES:

1 RABFAC Beacon Instructions (Omitted)
2 Laser Designator Instructions (Omitted)

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TAB E (Air Support Radar Team Procedures) to APPENDIX 2 (Air Support) to ANNEX M (Air Operations) to OPLAN _____ (U)

( ) Ref:

1. GENERAL

A number of items must be considered when planning the employment of an air support radar team. The specific tactical situation encountered will dictate the precise methods of employment and procedures used, however, some general guidelines can be provided which should be constant in all situations.

2. ASRT EMPLOYMENT CONSIDERATIONS

In order to make the most effective use of the ASRT, the selection of the radar site is of prime importance. The following stipulations must be considered:

a. Terrain.--High terrain is best, since terrain masking limits the use of the radar. If a depressed area is selected for the employment of an ASRT, the surrounding terrain will likely block out portions of the radar and thus reduce its effectiveness in the conduct of missions.

b. Accurate Positioning of ASRT's.--The ASRT must know precisely its location on the ground in order to provide precise information to aircraft that are working with it. Target locations are determined in relation to the ASRT location and error in this area could be fatal. In addition to a level survey, the ASRT requires at least four calibrator flights by aircraft dropping ordnance. The flights must be accompaniied by an air observer.

c. Target Proximity.--Prior to deploying the ASRT's into the FEBA, commanders must give careful consideration to the areas in which he can place the ASRT. They should be positioned within range of the most probable target areas.

d. Protection.--Although the ASRT should be located relatively close to enemy targets, it should, nevertheless, be very well protected by friendly forces. The ASRT provides an important and potent link between the ground and air forces which vastly extends the fire support measures available to ground units.

3. ANCILLARY CAPABILITIES OF THE ASRT

Commanders and planners should keep in mind that ordnance delivery is only one of several uses of the ASRT. It can also position aircraft for:

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a. Photographic reconnaissance.

b. Paradrop of troops or supplies.

c. Insertion of troops/supplies into landing zones.

d. Medevac.

e. Limited GCA.

4. MISSION ASSIGNMENT SEQUENCE

ASRT targets are normally developed by the division targeting system. The ASRT target is forwarded to the DASC, and the DASC passes the information to the ASRT. If time permits, the TACC is also notified of the target coordinates. A frag order is sent to the squadron earmarked for the assignment which usually contains:

a. Call signs.

b. Frequencies/alternates.

c. A position (usually a TACAN fix) where contact is to be made with the ASRT, if radar flight following is not available in the AOA.

d. Altitude.

e. Ordnance load.

f. Nature of the target.

5. AVAILABILITY OF BEACON CONFIGURED AIRCRAFT

The capabilities of the ASRT are enhanced when ASRT beacon equipped aircraft are used. Aircraft scheduling should be adjusted to ensure that such aircraft are employed when ASRT missions are fraged.

6. AIRBORNE PROCEDURES

Airborne procedures normally follow the briefed pattern which is conducted in consonance with the frag order. It may be important to mention two aspects of the airborne procedures for emphasis. These are:

a. The ASRT searches for the incoming assigned aircraft at the prebriefed location in the sky. It is, therefore, crucial that the TACAN fix or location over the ground designated in the brief be closely adhered to by the aircrew. This is also true of the altitude assigned.

b. Although all aircraft are capable of flying ASRT missions, only the A-4 is equipped with the fully automatic system, through which the ASRT can not only maneuver the A-4 over the target, but can automatically release the ordnance.

7. BDA PROCEDURES

The nature of the normal ASRT mission (e.g. at night, out of visual contact with an observer) makes damage assessment often extremely difficult to obtain. But, such information is essential and either the attack aircraft, the ASRT, or a reconnaissance aircraft should obtain BDA information and transmit it to the appropriate authorities as soon as it is feasible. Every effort should also be made to ensure that the ground intelligence system is cognizant of damage assessments. If the target remains a threat, then it must be either reattacked or avoided.

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TAB F (General Instructions and Safety Procedures) to APPENDIX 2 (Air Support) to ANNEX M (Air Operations) to _____ OPLAN _____ (U)

( ) Ref: (a) FMFM 5-2 Series, Joint Munitions Effectiveness Manuals

1. ( ) GENERAL

Coordination of fire support means is a necessity to preserve assets and provide for the safety of friendly forces thus enabling the massing of fire power effectively and efficiently.

2. ( ) CONCEPT

The application of air power must be coordinated with other means, not only for safety purposes, but also to ensure the proper application of sufficient force without piecemealing fires on a given target or over expending ordnance.

3. ( ) CONDUCT

a. Target Evaluation.--Evaluation of the target to establish requirements for the amount of ordnance required should be conducted in accordance with appropriate JMEM's (reference (a).

b. Altitude Separation.--Define any altitude restrictions or separations to be used by aircraft enroute within the target areas (must be coordinated with guidance provided to helicopters, AFAC aircraft, etc.).

c. Route Separations.--Define route restrictions or separations to be used by aircraft en route within the target areas.

d. Bingo Requirements.--Identify BINGO fields and fuel for CAS and AFAC aircraft as appropriate.

e. Weather.--Provide instructions on adjustments to be made for weather factors such as criteria for changing to armanent for low level delivery, penetration, and departure procedures, etc.

f. Troop Safety.--Establish criteria for closest proximity to friendly troops for the delivery of each type of ordnance.

g. Fire Support Coordination.--Recap briefly methods to be used for coordination by appropriate agencies within the command (TACP, AFAC, DASC, etc.) to resolve potential or actual fire support (to include mortars) conflicts. Fire support coordination line for initial stages of operation show in Enclosure 1 of this tab. Airspace

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coordination area guidance for pilots and air controllers is contained in Enclosure 2 to this tab.

4. ( ) ADMINISTRATION AND LOGISTICS

5. ( ) COMMAND AND SIGNAL

ENCLOSURES:

1 Fire Support Coordination Line
2 Airspace Coordination Area

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ENCLOSURE 1 (Fire Support Coordination Line) to TAB F (General Instructions and Safety Procedures) to APPENDIX 2 (Air Support) to ANNEX M (Air Operations) to ______ OPLAN ______ (U)

( ) Ref:

1. ( ) GENERAL

The fire support coordination line is an imaginary line arranged, if possible, to follow well defined geographical features forward of which supporting forces may attack targets without danger or reference to the ground forces.

2. ( ) CONCEPT

The FSCL is prescribed by the ground commander and coordinated with appropriate supporting; i.e., air, naval gunfire (NGF), artillery commanders. Behind the FSCL target, attacks not under control of the ground commander, must be coordinated with the ground commander. Beyond the FSCL, attacks by a supporting force must be coordinated with other supporting forces.

3. ( ) CONDUCT

a. Prescribing the FSCL.--Describe means for prescribing the FSCL and for disseminating the trace of the FSCL.

b. Trace of the FSCL.--The trace of the FSCL will be defined for each day that aircraft schedules are published in Appendix 7 to this annex. (The trace should be descriptive and easily transferrable to maps used in the cockpit. Thus, it will read "from coordinates NE along Swamp River to the bridge at coordinates thence N along Highway 100 to the railroad/highway junction at coordinates, continuing W along the railway to the rail tunnel at coordinates then SW along the ridgeline terminating at coordinates.) The hour at which the new trace is to become effective must also be indicated.

(1) Pre-D-day.

(2) D-day.

(3) D+1.

(4) D+2.

c. Coordination.--Coordination instructions are to be written (for the appropriate command issuing this enclosure) to define the means

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by which air attacks conducted behind the FSCL will be coordinated with the ground commander and other supporting arms.

(1) Air-ground coordination.

(2) Air-artillery coordination.

(3) Air-NGF coordination.

4. ( ) ADMINISTRATION AND LOGISTICS

a. Administration

b. Logistics

5. ( ) COMMAND AND SIGNAL

a. Command

b. Signal

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ENCLOSURE 2 (Airspace Coordination Area) to TAB F (General Instructions and Safety Procedures) to APPENDIX 2 (Air Support) to ANNEX M (Air Operations) ______ OPLAN ______ (U)

( ) Ref:

1. ( ) GENERAL

Airspace coordination areas are safety measures for friendly aircraft. The airspace coordination area establishes an airspace that is reasonably safe from friendly surface delivered fires.

2. ( ) CONCEPT

Define the conceptual use of the airspace coordination area in this operation.

3. ( ) CONDUCT

a. Establishment.--Define the authority, means, and method for establishing the airspace coordination area.

(1) Authority.--Who will establish, who will advise.

(2) Means.--They will be put into effect and disseminated by (normally the FSCC).

(3) Method.--Describe the method to be used to establish this safety measure. A helicopter lane may become incorporated as an airspace coordination area when in use. However, the size will have to be enlarged if the operational concept includes fixed-wing aircraft as escorts for the helicopter assault aircraft. In all cases, the methods must provide for ease of identification by the pilots in the cockpit enabling them to stay within or outside of the prescribed area. For airspace coordination areas, entry, and exit considerations must be taken into account on the part of the planners.

b. Control.--The agency controlling the affected areas (normally the same as that agency used as the means for establishing them) must be given (or give) guidance as to the times the prescribed restrictions are affective, and how this will be incorporated into the air operations of landing force aviation.

c. Coordination.--The details of coordination between concerned agencies and those agencies and the aircraft, artillery, NGF, and other affected fire support means must be delineated.

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4. ( ) ADMINISTRATION AND LOGISTICS

a. Administration

b. Logistics

5. ( ) COMMAND AND SIGNAL

a. Command

b. Signal

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APPENDIX 4 (Interdiction and Armed Reconnaissance) to ANNEX M (Air Operations) to OPLAN _____ (U)

( ) Ref: As appropriate

1. INTERDICTION

In keeping with the purpose and concept of interdiction, a plan is likely to be formulated which will employ the deep strike capability of aircraft. Rail lines, roads, bridges, or any of the lines of communication which connect the AOA with potential supply areas will probably need to be interdicted. Assignments of aircraft and armament will be in response to the target and perhaps its location, and can only be determined when the specifics of a situation are known. Tab A of this appendix is an interdiction point overlay, showing the targets and routes to be flown as well as any useful information which the pilot may need to know.

2. ARMED RECONNAISSANCE

The purpose of aerial armed reconnaissance is to locate and attack targets of opportunity in assigned general areas or along communication routes. As a side effect, however, useful intelligence can be obtained from the aircrews who fly these missions. Since overall operational plans often stipulate the employment of armed reconnaissance missions, the planners will need to know how to construct an armed reconnaissance route overlay, an example of which is provided in Tab B of this appendix.

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TAB A (Interdiction Overlay) to APPENDIX 4 (Interdiction and Armed Reconnaissance) to ANNEX M (Air Operations) to OPLAN _____ (U)

( ) Ref: As appropriate

1. This paragraph and any subsequent subparagraphs will contain a brief discussion of the interdiction mission to be flown as well as introduce and describe the interdiction overlay which will be attached. The overlay itself will show routes to be flown, points of interdiction, the location of any friendly forces--the area, and the location of any known potential threats to the aircraft and crew.

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TAB B (Armed Reconnaissance Route Overlay) to APPENDIX 4 (Interdiction and Armed Reconnaissance) to ANNEX M (Air Operations) to OPLAN ______ (U)

( ) Ref: As appropriate

1. This and any necessary subsequent paragraphs will contain a brief discussion of the armed reconnaissance mission to be flown as well as an introduction and description of the armed reconnaissance route overlay which will be attached. The overlay itself will show the routes to be flow, the targets which the aircrew might expect to encounter, the position(s) of any friendly forces, the area, and the location of any known potential threat to the aircraft/aircrew.

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APPENDIX C

TYPICAL FRAGMENTARY ORDER

Section I.--ATTACK FRAGMENTARY ORDER FORMAT

1. ( ) UNIT ASSIGNED MISSION; EVENT/MISSION NUMBER

   a. Target. (Target numbers found in Appendix 4 to Annex B.)

   b. Number and type of aircraft.

   c. Ordnance load and fuzing. (Codes found in Appendix 6 to Annex M.

   d. Time on target/station.

   e. Reference and orbit. (Found in Tab B to Appendix 14 to Annex M.)

   f. Communications. (Frequency codes found in Tab A to Appendix 8 to Annex M, Control Agencies Designated.)

   g. Coordinating instructions.

2. ( ) UNIT ASSIGNED MISSION; EVENT/MISSION NUMBER

   a. Etc.

Section II.--SAMPLE FRAGMENTARY ORDER

FROM: CG, 4TH MAW
TO: 4TH MAW

SUBJ: AIR OPS 0100Z

REF: A. MY OPORD 101-68

1. MAG 41; EVENTS 43 A-G.

    A. CAS ALERT.

    B. 7 A4 FLTS OF 2 A/C.

    C. LOAD: 1 A/C EACH FLT 4 C-4, 2 R-1.

    D. TOS 0640-0750, 0750-0900, 0900-1010, 1230-1340, 1450-1600, 1600-1710, 1710-1820.

    E. ORBIT 170° R/55 NM (DESIGNATED TACAN).

    F. FREQ - BLUE/GREEN.

    G. CONT BLUE BOY ONE.

2. MAG-42; EVENTS 53 A-D.

    A. ETC.

APPENDIX D

JOINT AIR STRIKE MISSION DATA/REPORT

JOINT AIR STRIKE MISSION DATA/REPORT (Close Air Support/Air Interdiction).			
AIR STRIKE MISSION DATA			
Flight Call Sign	Mission Number	No./Type A/C	Ordnance Load
Flight Planning Data			
TOT	Orbit/RNDVS		Planned Airspace Coordination Area Number Times Locations Width Altitudes/VERTEX
Initial contact C/S	Pri	Sec	
FAC/ASRT C/S	Pri	Sec	
*Target - Coordinates	Elevation	*Alt Setting	Winds
Attack Heading	Breakout	Ordnance Sequence	
Target Information			
Friendly Positions		Marking	
		(ECM Pods ON/OFF Locations)	
* Not required for close air support missions.			

JOINT AIR STRIKE REPORT

Control Agency (Call Sign)	This is (Call Sign)	Event/Mission	Mission No.

1 Target Identification/Location

$\boxed{A}$ (Number) $\boxed{B}$ (Coordinates) $\boxed{C}$ (Type)

2 TOT/Time of Sighting

$\boxed{A}$ (On target) $\boxed{B}$ (Off target)

3 Results

$\boxed{A}$ Complete $\boxed{B}$ Partial

$\boxed{C}$ None $\boxed{D}$ Unknown

$\boxed{1}$ Destroyed $\boxed{2}$ Neutralized $\boxed{3}$ Covered

$\boxed{4}$ (Other

4 Enemy Action

$\boxed{A}$ Ground

$\boxed{1}$ None $\boxed{2}$ Light $\boxed{3}$ Moderate $\boxed{4}$ Heavy

$\boxed{5}$ (Type)

$\boxed{B}$ Air

$\boxed{1}$ Number $\boxed{2}$ (Type)

5 Own Status

$\boxed{A}$ No Factor $\boxed{B}$ Damaged $\boxed{C}$ Lost $\boxed{D}$ Number

6 BINGO Time Is

(Time)

7 Ordnance Remaining Is

$\boxed{A}$ Number $\boxed{B}$ Type

8 Weather Is

$\boxed{A}$ Clear $\boxed{B}$ Scattered

$\boxed{C}$ Broken $\boxed{D}$ Overcast

$\boxed{1}$ 1-5 $\boxed{2}$ 5-10 $\boxed{3}$ 10-50 $\boxed{4}$ 50-100

9 Remarks

Date/Time Reported	Number

APPENDIX D

INSTRUCTIONS FOR USE OF JOINT AIR STRIKE MISSION DATA/REPORT FORM

JOINT AIR STRIKE MISSION DATA/REPORT FORM (FRONT)

The Joint Air Strike Mission Data/Report Form is needed for recording data necessary to accomplish the mission. The "Flight Planning Data" section may be used for flight lineup, fire control settings, BINGO fuel, and other data, as necessary. Appropriate portions of the form are used by the final control agency in briefing mission pilots; e.g., the forward air controller (FAC) uses the target information portion to brief those items in sequence. Those items used by the FAC may be extracted for printing on a FAC mission card providing the mission briefing data sequence is not altered and the Joint Air Strike Report Form is printed on the back of it.

INSTRUCTIONS FOR USE OF JOINT AIR STRIKE REPORT FORM (BACK)

Title and Element(s)	Explanation
Heading	Initiates communication contact.
Control Agency	Identifies control agency called.
This is	Identifies agency initiating call (e.g., FAC aircraft).
Event/Mission	Identifies specific mission by assigned number.
Mission No.	Assigns mission number.
Line 1. Target Identification/ Location	1. Identifies target actually taken under attack by: (use A or B and C).
A. Number	A. Target list number.
B. Coordinates	B. Military grid coordinates.
C. Type	C. Target type (e.g., vehicle, bridge).
Line 2. TOT/Time of Sighting	2. Time aircraft spent on target.
A. Number	A. Time aircraft commenced attack.
B. Off Target	B. Time aircraft ceased attack.
Line 3. Results	3. Describes actual target damage which is correlated with desired results to arrive at a decision for the initiation of subsequent actions. Elements are self-explanatory.
A. Complete	
B. Partial	
C. None	
D. Unknown	
(1) Destroyed	
(2) Neutralized	
(3) Covered	
(4) Other	

Title and Element(s)	Explanation
Line 4. Enemy Action was	4. Indicates the enemy response, ground and/or air which was encountered during the conduct of the mission. Used as an air intelligence input.
A. Ground	A. Enemy fire encountered from ground during the conduct of the mission.
(1) None	(1) Self-explanatory.
(2) Light	(2) Self-explanatory.
(3) Moderate	(3) Self-explanatory.
(4) Heavy	(4) Self-explanatory.
(5) Type	(5) Indicates type of fire encountered (e.g., small arms automatic weapons, AAA).
B. Air	B. Enemy aircraft sighted or encountered during the conduct of the mission.
(1) Number	(1) Self-explanatory.
(2) Type	(2) Indicates type aircraft sighted or encountered (e.g., MIG-21, BADGER, FISHBED).
Line 5. Own Status	5. Describes the present status of the mission with regard to enemy action encountered, used to initiate medical or rescue support.
A. No Factor	A. No damage.
B. Damaged	B. Indicates aircraft damaged by enemy ground/air fire. Aircraft flyable.
C. Lost	C. Aircraft downed by enemy ground/air fire.
D. Number	D. Indicates the number of aircraft damaged or lost.

Title and Element(s)	Explanation
Line 6. BINGO Time is	6. Defines the time at which the aircraft must depart the area to insure safe recovery. Used as a decision base for assignment to subsequent missions.
Line 7. Ordnance Remaining is	7. Indicates the usable ordnance remaining within the aircraft flight. Used as a decision base for assignment to subsequent missions.
A. Number	A. Indicates the total amount of ordnance available for secondary targets or subsequent missions.
B. Type	B. Indicates the type of ordnance remaining. Element may be coded if necessary.
Line 8. Weather is	8. Describes the basic weather in the target area.
A. Clear	A. No cloud cover.
B. Scattered	B. Less than 5/10 cloud cover.
C. Broken	C. Less than 5/10 to 9/10 cloud cover.
D. Overcast	D. 9/10 or more cloud cover.
For B, C, and D:	
(1) 1-5	(1) Height of clouds, AGL 100 to 500 feet.
(2) 5-10	(2) Height of clouds, AGL 500 to 1,000 feet.
(3) 10-50	(3) Height of clouds, AGL 1,000 to 5,000 feet.
(4) 50-100	(4) Height of clouds, AGL 5,000 to 10,000 feet.
Line 9. Remarks	9. Amplifying statements regarding the mission.
Date/Time Reported	Defines the date and time of report transmission.
Number	A serial number assigned by the receiving agency for record and administrative use.

APPENDIX E

MISSION REPORT

HEADING

PRECEDENCE

ORIGINATING AGENCY

ACTION ADDRESSEES

INFORMATION ADDRESSEES

SECURITY CLASSIFICATION/CODE WORD OR NICKNAME

MISREP (Number) DATE-TIME GROUP (GMT)/MONTH/YEAR

BODY

1. AIR TASK/MISSION NUMBER OR NICKNAME. Reference the request number, frag order number, or directive causing initiation of the mission.

2. LOCATION IDENTIFIER. Target number, line number, approved target designator/identifier, or coordinates of the target or sighting being reported.

3. TIME ON TARGET/TIME OF SIGHTING. Report all times by date-time group, using GMT unless otherwise directed.

4. RESULTS/SIGHTING INFORMATION. This item should contain the pilot/aircrew evaluation of expected results (e.g., percent destroyed, number and type destroyed, or percent of coverage) and concise narrative information on significant sightings (e.g., unusual or new enemy equipment or concentrations of enemy forces observed to include number, speed, and direction (if applicable)).

5. REMARKS. Includes information not specifically mentioned in above items (e.g., enemy defenses encountered, weather data, hostile meaconing, intrusion, jamming and interference (MIJI) attempts, etc).

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JCS Pub 2, Unified Action Armed Forces (UNAAF)
JCS Pub 8, Doctrine for Air Defense from Oversea Land Areas
JCS Pub 10, Tactical Command and Control and Communication Systems Standards (U)
JCS Pub 12, Tactical Command and Control Procedures for Joint Operations

2. LANDING FORCE MANUALS

LFM 01, Doctrine for Amphibious Operations
LFM 02, Doctrine for Landing Forces
LFM 04, Doctrine and Procedures for Airspace Control in the Combat Zone

3. FLEET MARINE FORCE MANUALS

FMFM 2-1, Intelligence
FMFM 3-1, Command and Staff Action
FMFM 3-2, Amphibious Training
FMFM 3-3, Helicopterborne Operations
FMFM 4-1, Logistics and Personnel Support
FMFM 4-2, Amphibious Embarkation
FMFM 4-3, Shore Party and Helicopter Support Team Operations
FMFM 5-1, Marine Aviation
FMFM 5-2 Series, Joint Munitions Effectiveness Manuals (U)
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FMFM 5-5, Antiair Warfare
FMFM 5-5C, Employment of the Forward Area Air Defense Battery (U)
FMFM 6-1, Marine Division
FMFM 6-2, Marine Infantry Regiment
FMFM 6-3, Marine Infantry Battalion
FMFM 7-1, Fire Support Coordination
FMFM 7-2, Naval Gunfire Support
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FMFM 8-1, Special Operations
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5. U.S. ARMY FIELD MANUALS

FM 1-15, Aviation Company, Battalion, Group and Brigade
FM 1-100, Army Aviation Utilization
FM 101-5, Staff Officers' Field Manual: Staff Organization and Procedure

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AFM 2-2, Air Operations in Conjunction With the Amphibious Operations
AFM 2-7, Tactical Air Force Operations--Tactical Air Control System
TACM 1-1, Tactical Air Forces in Joint Operations
TACM 2-4, Tactical Air Control Party

7. MARINE CORPS ORDER

MCO 3120.3, The Organization of Marine Air-Ground Task Forces

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☆U.S. GOVERNMENT PRINTING OFFICE: 1979-631-788/2989

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FMFM 5-5C

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DEPARTMENT OF THE NAVY
UNITED STATES MARINE CORPS

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